

Flight, September 23, 1911.



A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

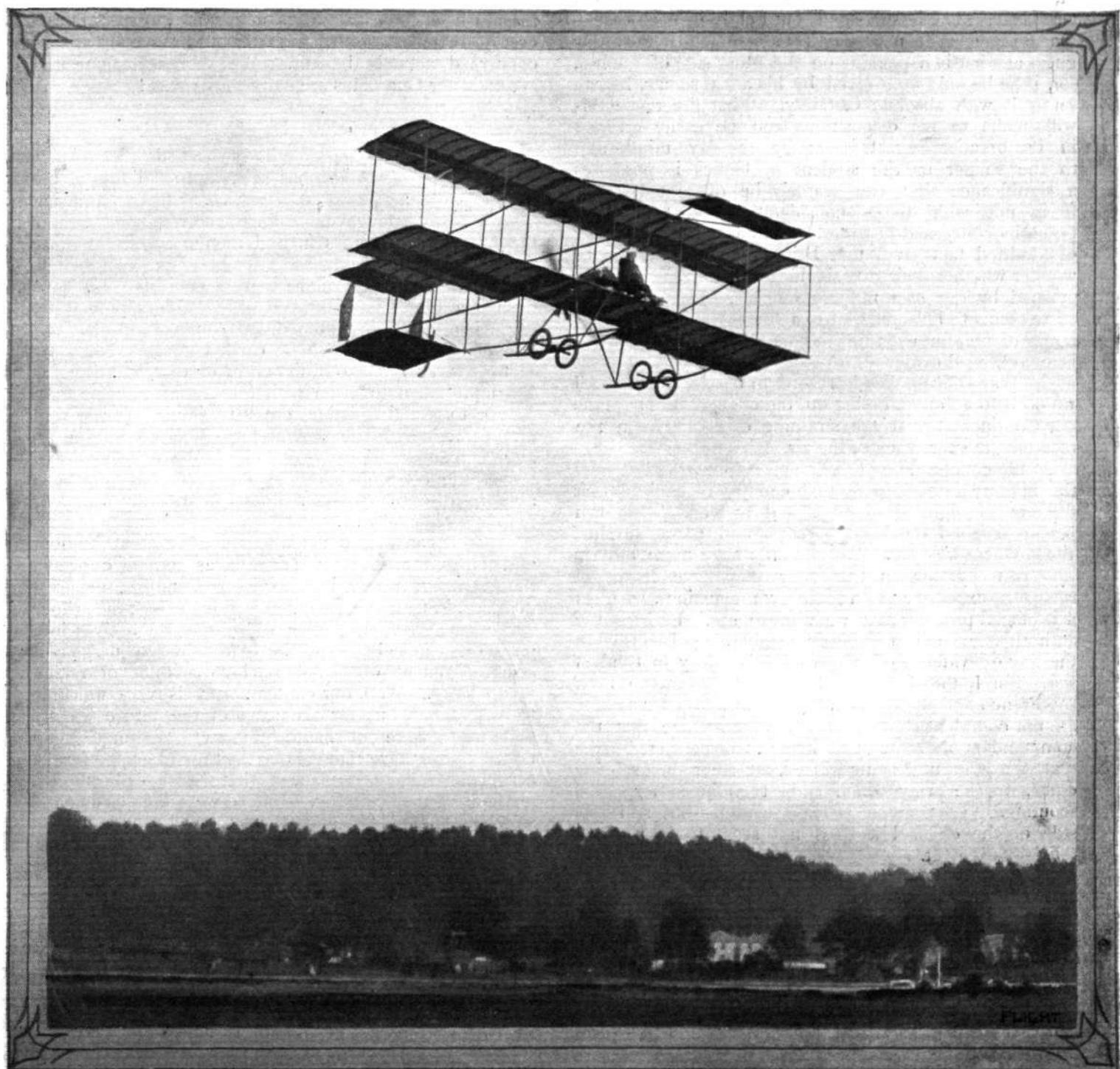
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Mr. G. Blondeau, who with Mrs. Maurice Hewlett had such a very unpleasant experience at Plymouth last week, flying at Brooklands on a Farman biplane, with which he in the past has done such fine flying. As we recorded last week, Mr. Blondeau and Mrs. Hewlett in a very sportsmanlike manner returned their fees in view of the clamorous and unbecoming behaviour of the crowd who were kept waiting for a short period for the flying.

EDITORIAL COMMENT.

The French and German Manoeuvres. Doubtless the British Military attachés who followed the French and German manœuvres which recently concluded, will be able to supplement the newspaper reports of the remarkable showing made by the aeroplane, to the immense enlightenment of our stay-at-home War Office officials. Naturally, they will have much to say about the purely military, that is to say, the strategical and tactical value of the operations carried out by the two armies, but unquestionably the principal lesson that is to be learnt in connection with them is that relating to the complete change in the tactical situation of opposing armies in the field by the coming of the aeroplane. The lesson stands out boldly in each case—that no longer is it necessary for a commander to simply guess at what is happening on the other side of the hill, for, if he be only well served by his aerial scouts, he can know it with absolute certainty. What difference this will make to his dispositions can be easily grasped in its broader aspects even by the lay mind, and to the soldier or the student of tactics it possesses a significance that can scarcely be over-rated. But it is not with these considerations that we are primarily concerned just now. They are of the character of admitted facts and, that being so, we are given to wonder whether their true significance is even yet fully grasped by our own military officials. It is true that there seems to be somewhat of a stirring among the dry bones of late, but even now it cannot be said that there is any outward evidence to point to any marked reversal of the War Office policy in regard to the aeroplane. All we do is to go on, dabbling on the edge of things while our Continental rivals are straining every nerve in the race for the supremacy of the air.

At the conclusion of the French manœuvres last year the military authorities of that country recognised that the era of fighting air-craft had arrived. Our own people laughed the idea to scorn, and we are still just about where we were. We certainly have more officers who can fly, but in the main they have learnt at their own expense and on their own machines, whereas it is official progress that we want to see. Perhaps the authorities have been waiting for something conclusive in the way of evidence of the aeroplane's utility in time of war. Surely they have got all that in the records of both the French and the German operations. So far as they are not confidential it is common knowledge that the commanders of each and all of the armies engaged agree that victory in future wars will go, all other things being equal, to the army which is best equipped for aerial scouting. That much is fairly certain—but still this side of the channel it does not seem to be realised officially even yet.

* * *

Sorry they Spoke! The Westminster Board of Guardians appears to be very anxious to know who is to pay for the treatment of patients who may be injured in accidents occurring at the Hendon aerodrome. The matter was discussed at a recent meeting of the Guardians, when it was pointed out that when an accident happened the injured aviator was taken to the Central Sick Asylum, which is situated close to the gates of the aerodrome. Now, this asylum is not a general hospital, but is maintained out of the rates of the parishes of Westminster, St. Giles, Bloomsbury and

the Strand, and should thus be reserved exclusively for the use of patients residing in one or other of these districts. The Guardians are really very worried about the situation created by inconsiderate flying-men, who meet with accidents apparently for the sole purpose of taking advantage of the hospitality of the Central Sick Asylum. If things continue along their present course—well, there is no knowing what might happen. The *Evening News* has concerned itself with the worrying-out of the problem which is agitating these worthy Guardians of the Poor, and has discovered that, so far from the injured flying-man being a charge upon the funds of the asylum, he is invariably a source of revenue, inasmuch as he usually pays money far in excess of the cost of treatment, so that the rates of the several parishes concerned actually benefit. We should imagine the Westminster Guardians are sorry they spoke!

Critics of the Aerial Post. That grandmotherly sheet, the *Manchester Guardian*, has seen fit to fall foul of the aerial postal service. "An amusing enough game for the silly season," is how

the *Guardian* describes it, and then proceeds to treat the whole subject with an attempt at levity which is more amusing in its failure than it could possibly have been as a humorous effort. It will regard as premature, says this dear old mitten lady, any report that the Scotch (*sic*) mails are to be carried up Ben Nevis by motor car, *en route* to Edinburgh, or that Mr. Burgess has undertaken to swim with the American mail from Dover to Calais, where the "Lusitania" (by special arrangement with the Postmaster-General) will be in attendance to receive it from him. We have read and re-read the *Guardian*'s article, but really have not been able to discover whether it is intentionally funny or merely accidentally so.

When it has ceased its laboured attempt at humour and comes down to what it regards as serious criticism, the *Guardian* gravely informs its readers that the aerial post has, in fact, demonstrated nothing except the ardour with which grown-up people will throw themselves into game of make-believe and the extraordinary courage and accomplishment of Mr. Hamel as a pilot of racing monoplanes. Well, our contemporary is very welcome to its opinions, but for the sake of the future we are thankful they are not shared by many. We ourselves do not and never have claimed that the time has come for the aeroplanes to take the place of what we may call orthodox methods of mail-carrying. Indeed we will go farther and say that we cannot see that that time will ever come, but what we do maintain is that so far from the present service being of no value, it carries a most distinct and very valuable object-lesson in future commercial possibilities of aerial transport. Beyond this we do not propose to read the old lady of Manchester a homily upon the real usefulness of what appears to her to be simple futility. It would be a simple waste of time to do anything of the sort. It is impossible to reason the ostrich out of its habit of hiding its head in the desert sands, and the *Guardian* has ever been remarkable for being half-a-century behind the times in ideas and opinions. Let it refer back to its own files for confirmation of what we have said—there is ample proof of the truth of that statement to be found therein.

SEPTEMBER 23, 1911.

FLIGHT

FLIGHT PIONEERS.



Mr. G. BLONDEAU.

SOME NOTES ON BODY DESIGN.

ANYONE who has studied in detail the descriptions of the principal aeroplanes as they are published in FLIGHT from time to time, can hardly fail to have been impressed first of all with the increased attention that designers are giving that part of the machine that is obviously entitled to be called its body—although still frequently referred to by the French term fuselage—and, secondly, to the importance of body form as a structural feature in the general assembly of the machine.

As some of the principal points at issue, however, may have escaped notice, it is not without purpose to attempt to correlate some of those that appear to be more particularly worthy of consideration. In monoplanes, which always have had a proper body as a backbone to their anatomy, any discussion of this kind necessarily resolves itself into a comparison of different forms, but there is, ere this stage is reached, a more fundamental consideration affecting the value of the body itself. On biplanes, there was at one time no structure that could properly speaking be called a body, but the tendency in design at the present time—which may be said to have been inaugurated at the last Olympia Show—is to incorporate a body on machines of this type.

In considering the pros and cons of any feature of this magnitude in aeroplane design, it is necessary to regard the subject from certain well defined points of view. There is the question as to how the change will affect the efficiency of the machine, there is the question as to how it will modify its construction, whether it will facilitate the transport of the aeroplane by road or rail, and whether the safety of the pilot will be enhanced.

All these matters are of very great importance, and, of the considerations enumerated, it is impossible to lay too much stress on that last mentioned.

So much work has already been expended, and so much space devoted to demonstrate the superiority of the engine-in-front type of aeroplane from the safety point of view that the writer does not intend to rake the whole subject over again. Sufficient to state that the pilot, provided with an elastic belt, who sits behind his motor with plenty of bendable or breakable framework between himself and the ground, stands a much better chance of escape in the event of a sudden and involuntary landing than the one who sits in front of everything in such a manner that he is the first to strike *terra firma* while the machine is at liberty to pile itself up on top of him.

Where ease of erection and dismantling is concerned, this type again scores over the machine of cellular construction.

The writer, with two friends, one of whom is now a prominent aviator, has had the painful experience of dismantling in one day two bodiless biplanes, wheeling the cellules on improvised trolleys, constructed out of the landing chassis, to the station, about a mile distant, and loading them on railway trucks.

The whole operation occupied his attention from six o'clock in the morning till about eight o'clock in the evening, and it was with a feeling something akin to remorse that he first witnessed the dismantling of a Breguet, a process that occupied as many minutes as he took hours.

Then again, a machine that is constructed with a fuselage as the nucleus of the design is a much easier proposition to repair in case of breakage. Repairing is more in the nature of replacing broken parts than the wholesale integral reconstruction of the machine.

The only advantages that the fuselageless machine ever possessed were the constructional simplicity of placing the propeller behind the pilot and his uninterrupted view above, below, and before him.

These can no longer be considered advantages peculiar to that system, as the propeller draught of the fuselage and engine-in-front type of machine is by no means an inconvenience so long as the exhaust products of the engine are conducted away clear of the pilot, while it is only in the monoplane of this type that the view is not altogether perfect.

By the way, manufacturers seem to have been a long time devising a transparent footboard for bodies in order that the pilot may see exactly what is beneath him without having recourse to a steep dive. Messrs. Voisin have apparently been the first to adopt this feature on one of their latest machines.

While upon this subject, it is really surprising that many constructors persist in adhering to the narrow and shallow type of body, while the more capacious type has so many important features to commend it.

Consider its superiority on the score of strength alone. Not only is the wide and deep body better fitted to withstand strains at right angles to its length but it is a great deal less likely to become distorted torsionally.

Then as regards the comfort and safety of the pilot. Some machines are equipped with bodies that are so shallow that the pilot sits within not much more than six inches of the top and so not only is he liable to become unseated on encountering a really bad gust—there are several cases of this on record—but his own body is exposed to the rush of air.

In addition to the discomfort that this affords him personally must be reckoned the numerous square feet of unnecessary head resistance he offers, and the consequent state of discontinuity in the air flow.

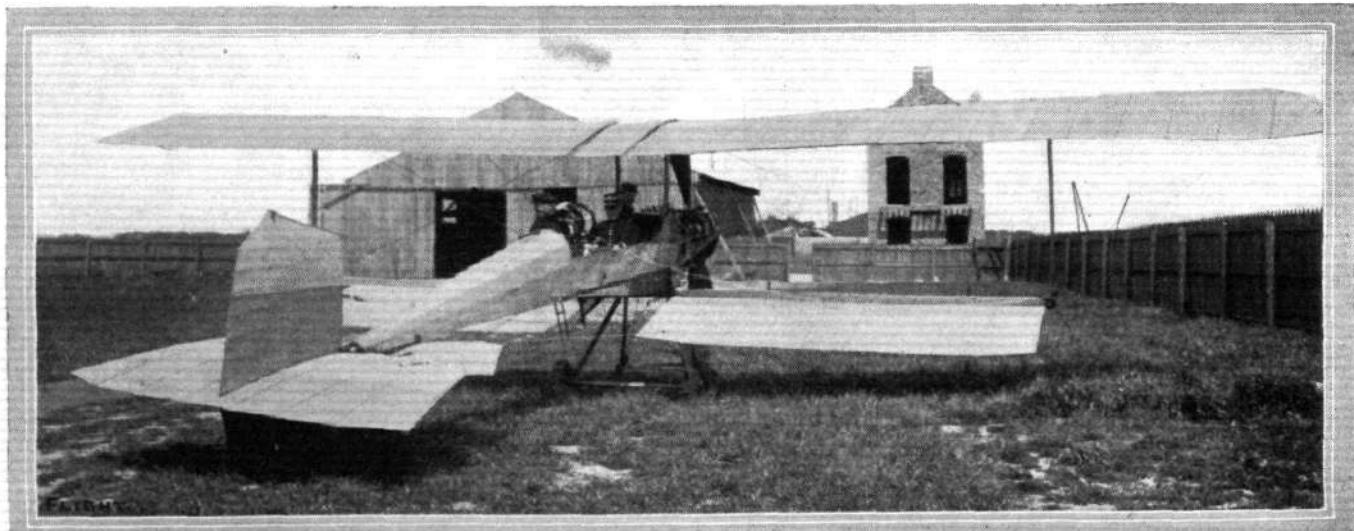
This could all be remedied by the adoption of a deep streamline body of the Nieuport type in which the pilot sits so low that not only is it impossible for him to be thrown off his seat, but, as his head is all that appears above the cockpit, head resistance is reduced to a minimum and at the same time he is amply protected.

Regard for a moment the consideration of "local" strains that have to be withstood at the portions where the engine and landing carriage are attached. Fittings of this kind should be spread over as large an area of fuselage as is practicable, and of course it follows that the larger the body the larger can be the area over which these strains can be distributed.

The Vickers main body affords an excellent illustration of the soundness of utilising a deep fuselage, for not only does this form a good directional keel but the wires that stay the wings from underneath may be connected directly to it at its lower longitudinal member instead of adopting the scheme of attaching them to such a vulnerable part as the under carriage.

In the opinion of the writer, the only good point in favour of the narrow fuselage is its undoubtedly pleasing appearance. This is really a more important point than is at first apparent, for already a prospective buyer will sometimes give as much attention to the machine's beauty of outline as to its mechanical qualities.

Still even in this respect there is no reason why the shallow body should score over a well designed one of ample proportions.



View from behind of one of the new Military Breguet Biplanes which have been employed during the French Manoeuvres.—The three officers on board are able to dispose themselves quite comfortably in the body of this machine.

A Study of Bird Flight

By Dr. E. H. Hankin, M.A., D.Sc.
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CHAPTER XV.—The Source of the Energy in Soaring Flight.
SOARABILITY in Agra occurs in three types, which may be described as follows:—

1. "Sun soarability." This is observed in fine weather, chiefly in the cold and hot seasons. If, though the weather is otherwise fine, there is a thin layer of cloud over the sun the soarability of the air may be diminished. Sun soarability may be abolished by heavy cloud shadow. Further, the fact of this kind of soarability commencing at a definite hour in the morning, earlier in summer and later in winter, may be regarded as a further proof that the source of the energy involved is to be found in the rays of the sun. Sun soarability is not diminished by absence of wind.

2. "Storm soarability."—This form of soarability may be observed in the wind preceding a dust storm or thunderstorm, and also at the sides of a thunderstorm. It is usually observed in the presence of cloud and wind. The facts that it may occur after sunset, and shortly after sunrise, are proofs that sun energy is not involved, at least directly. Stormy winds may occur that are completely unsearable. In such cases sunshine and signs of electrical disturbances are absent. Cheels rising into the air in winds of this nature are almost instantaneously blown to leeward. That is to say the only energy available (apart from flapping) was the energy they possessed in virtue of their having been seated on the earth before rising into the air. As soon as this energy was exhausted they had to glide steeply or else were blown to leeward.

3. The above generalisation suggests that soarability may depend on what may provisionally be regarded as two sources of energy. Supposing these two sources of energy were operative together, each at less than full strength, and in varying proportions, it may be imagined that a form of soarability would be produced whose nature would be very difficult to determine. Perhaps this is the nature of the soarability that I have observed frequently in Agra during the monsoon season (July to September), and occasionally at the time of the cold weather rains (December and January). Perhaps this kind of soarability has come under the notice of other observers in certain cases. This "disturbed weather soarability" may vary, perhaps, from hour to hour in its nature. Less energy usually appears to be available than in typical sun or storm soarability. It appears to be less easily affected by cloud than is sun soarability. I have no proof that it is favoured or increased by absence of wind.

The facts already given may be regarded as presumptive proofs that sun energy is the source of the energy of sun soarability. I have now to describe some observations that I think will be regarded as demonstrative proofs of the connection between sun energy and sun soarability. These observations were carried out at Naini Tal during June, 1910.

Naini Tal is situated in the Himalaya Mountains at an elevation of between 6,000 and 8,000 ft. above sea level. The elevation of Agra is only about 500 ft. The air at Naini Tal is consequently more rarefied than that at Agra. It is therefore presumably less buoyant. But in the presence of strong sunshine the air in Naini Tal is at least as favourable for soaring flight as it is in Agra.

The species of birds studied in Naini Tal were the same as those on which most of my observations have been carried out in Agra, but with two additions. The species of crow present in Naini Tal has the power of soaring, at any rate in calm air, and in the presence of strong sunshine. The crow found in the plains of India is of a different species, and does not soar under any conditions. In Naini Tal I saw a few specimens of the "Lammergeyer" (*Gypaetus barbatus*), a vulture of 9 ft. to 9½ ft. span. It has a long tail, and is characterised by slow heavy flight. I have never yet seen in the flight of the Lammergeyer any sign of "relaxation of secondaries," an adjustment that will be described in later chapters as occurring in the flight of other species of vulture.

Gliding flight in mountainous country generally occurs in ascending currents of air. Despite this fact it will be seen that my observations made in Naini Tal lead to the clearest proofs that in soaring flight energy is taken from the air, and that it is somehow connected with the energy present in the sun's rays.

During the period of my observations (June, 1910), the wind was nearly always so feeble that ascending currents of air produced thereby were not sufficiently strong to support birds in soaring flight unless in the presence of sunshine or at least a strong glare of light. In Naini Tal cheels and vultures could often be seen circling when enveloped in thin cloud. Under heavy cloud, in which the amount

of light was diminished, soaring flight did not occur. The observations on which this statement was based were mostly made near a slaughter house in Ballia Ravine, just below Naini Tal. I was fortunate in getting permission to use a ledge overlooking the precipitous side of the ravine by the police lines as a post of observation. At this point the Ballia Ravine is about 300 feet deep, and has a width of 1,100 feet. Numerous vultures were in the habit of roosting on trees or rocks on the side of the ravine nearest my post of observation. During the daytime wind is nearly always blowing up the ravine from the valley below, sometimes clear and sometimes carrying cloud. Often cloud could be seen in process of formation by condensation of the rising air. When this was the case the amount of sunshine or glare varied rapidly from minute to minute, causing clearly observable changes in the degree of soarability of the air. For instance:—

June 18th, 1910.—At Ballia Ravine. 3.2.—Two cheels were circling in thin cloud. The air current was seen to be slowly rising though the wind was not sufficient to be felt. As glare decreased from further accumulation of cloud overhead the cheels were observed to cease circling and began flap-gliding in circles. No change occurred at the time in the rate of movement of the air.

That is to say, as the glare of light decreased, the air became less suitable for soaring flight. The following is a similar case:—

June 26th, 1910.—At Ballia Ravine. 11.45.—Wind very feeble, only occasionally perceptible. Four vultures had been circling enveloped in thin cloud. As the cloud above them got thicker, they ceased circling and glided down the valley. Two turned back after going a short distance and settled. The other two glided on further till on reaching sunshine they again began circling.

The following extract from my diary is an instance of several successive changes in the degree of soarability occurring coincidentally with changes in the amount of glare or sunshine:—

Sunday, June 12th, 1910.—At Ballia Ravine. 11.0.—Wind occasionally enough to move leaves. No puffs or eddies. Sunshine near. Two cheels circling. One vulture circling with occasional flaps.

11.15.—Another patch of sunshine. A black vulture, a white scavenger vulture and some cheels began circling. Shortly afterwards, as cloud rolled up overhead, these birds settled or disappeared.

11.32.—The cloud mass overhead was thinning so that there was a strong glare. A cheel seen circling in thin cloud. As the cloud lifted a group of 24 vultures were seen circling (in sunshine) over a hill two miles distant.

11.40.—Sun shining. The 24 vultures glided to the neighbourhood of the police lines. Some settled. A few flex-glided back down the valley and circled in front of an advancing cloud.

12.6.—This cloud was coming near. Two vultures were watched circling in this cloud for about three minutes. They disappeared as the cloud became thicker. This was wet cloud that deposited small drops of water on my clothes.

12.12.—Heavy cloud overhead, so that it was getting comparatively dark. Cheels settling.

12.29.—Though I was still enveloped in cloud the sun was shining sufficiently to throw faint shadows. Four cheels circling near.

12.30.—Six cheels circling near.

12.32.—Many cheels circling. Vultures starting and gliding down the valley. These vultures, at time of starting, were enveloped in thin cloud.

12.34.—Thick cloud overhead and noticeably darker. Cheels near had all settled. No cloud below in ravine.

12.35.—More glare. One cheel up circling. Less wind now, not enough to move leaves.

12.36.—Three cheels circling.

12.37.—Many cheels circling.

12.41.—Darker. Thick cloud above and also below me in the valley. Cheels no longer visible, probably settled.

12.44.—Sunshine visible some way down the valley, and cheels there rising and circling.

12.46.—A Lammergeyer seen circling in thin cloud near a patch of sunshine. This was below my level.

12.47.—Sunshine on opposite side of ravine. No cheels up on my side where there was still thin cloud. Four cheels circling down the valley in or near sunshine.

12.50.—Lighter. Cheels circling near, and two vultures gliding.

12.52.—Sunshine. One cheel circling high. Wind imperceptible. Small patches of cloud lying on opposite bank of ravine showed scarcely perceptible movement.

12.53.—Cheels were circling, and white scavengers and vultures were gliding. A Lammergeyer circling and another flex-gliding.

1.0.—Cloud in ravine disappearing. Sunshine and patches of blue sky. The birds had mostly flex-glided away to a distance, or had circled to a level with the tops of the neighbouring hills.

These observations may be briefly summarised as follows. At the beginning of the period of observation, in spite of an ascending current of air (the bottom of the ravine having a rate of ascent of about 1 in 5), the air was not soarable unless there was either sunshine or else a strong glare of light. Towards the end of the observations, as cloud cleared off, the air became sufficiently soarable to permit not only circling but also flex-gliding, although the ascending wind had so far ceased that its movement was imperceptible.

I made a few observations in Naini Tal on the formation of "heat eddies." As in Agra, these could be seen rising from the tops of houses or from the top of a stone wall in sunshine, and also in thin cloud, provided there was a strong glare of light. If the glare diminished from accumulation of cloud overhead, the eddies ceased. Apparently sunlight reflected from a cumulus cloud, or reflected from the snow ranges some 40 or 50 miles away, was not capable of producing heat eddies. Soarability seemed also to need direct action of sun energy. For instance:—

June 27th, 1910.—At Ballia Ravine.—3.22.—Slightly more light. A vulture started and, after gliding about 100 metres, returned and settled. Another started and returned after going about 300 metres. There was thick cloud behind me covering the sun. The glare was mostly by reflection from a cumulus cloud down the valley.

But it is difficult to see how heat eddies can be assumed to be the source of soarability. They only appear to be formed when sunshine (or glare) strikes solid objects. In the presence of strong glare, when birds are circling in thin cloud, not a trace of any eddy movement or anything resembling heat eddies can be seen anywhere near the birds. The thin cloud is usually not homogeneous, but in more or less discrete masses, so that the movement of every cubic foot of air relatively to neighbouring masses of air can be observed. Sometimes the air in the Naini Tal valley is filled with aerial seeds, similar to thistle down (but derived from a tree). These float in the air sometimes almost as thickly as snowflakes in a snowstorm. Their movements serve to indicate the direction of the wind as it flows regularly over the level surface of the lake, or as it is deflected as it meets the sides of the hills. But these aerial seeds show, so far as I have been able to observe, the same irregularity of movement after sunset, when the air is no longer soarable, as they do in the middle of the day when the air can support soaring flight.

On one occasion I was so fortunate as to observe a cheel circling and gaining height when enveloped in thin cloud and in a descending current of air. The cheel was gliding at first in an ascending current of air over the top of Sher-ka Danda Mountain (height 7,520 ft.). It came down the leeward side of the mountain, past where I was standing, at a point 7,400 ft. above sea level, and descended to about 30 ft. below me. The air current was just enough to gently move leaves, and was descending probably at an angle of about 15° with the horizon. The cheel then began circling in this descending current and gained height. On the windward side of one circle it made three flaps. Otherwise, without flapping, it regained a position over the top of Sher-ka Danda, and then glided out of sight. The total gain of height in the descending current of air must have been about 150 ft. During the greater part of its circling the cheel was enveloped in thin cloud, in which, as usual, not a trace of eddy movement was visible. I recorded in my notes that "at the time the cheel was gaining height, it was in cloud sufficiently thin to let through enough sun energy to make heat eddies, judging from the amount of glare at the time, and from the results of observation of heat eddies that I had made two hours previously."

CHAPTER XVI.—Proofs that more Energy is required for Flex-gliding than for Circling.

I have already stated that when, in the evening, soarability decreases, cheels and scavenger vultures are in the habit of collecting at the Agra Fort, and gliding in the ascending current of air over the windward battlements. With a certain strength of wind these birds occasionally glide along the battlements for long distances, keeping uniformly at a height of about 4 ft. or 5 ft. above the parapet. The distance along the battlements from a bastion near to the Delhi Gate to the next is 108 metres. On April 15th and 16th,

1910, I noticed that cheels glided this distance in 13, 14 and 14 secs.; this corresponds to a speed of 7.7 metres per second. Scavengers did the same distance in 11 $\frac{1}{2}$, 11 $\frac{1}{2}$, 12 and 12 secs.; this is equal to a speed of 9 metres per second.

On May 11th, 1910, when seated on the Delhi Gate at a point slightly above the level of the battlements, I made the following simple observation, which led to results of some importance:—

5.30.—Cheels noticed that were gliding beam on to the wind, parallel to the battlements, and at a height of 3 ft. or 4 ft. above them. The secondary quills of the leeward wing appeared relaxed—the hinder ends of these feathers, that is to say, were higher than the ends of the feathers of the windward wing. The difference in level was probably 1 centimetre, perhaps as much as 2 centimetres. The birds were gliding on a level keel.

This observation led me to notice the position of the secondaries under different conditions. On the following day I was watching cheels "wind-facing" over the battlements in a light wind. Suddenly the wind increased in strength. Immediately the cheels relaxed their secondaries and increased the flexing of their wings—that is to say, instead of ease-gliding they were flex-gliding. Their speed had increased *pari passu* with the increase of speed of the wind, so that they retained their position over the battlements. Hence the peculiar appearance presented by the wings of cheels in flex-gliding is due to the fact that, concomitantly with the decrease in span, there is a relaxation of the secondaries, which, as I shall show later, is equivalent to a decrease in camber in the case of slow flex-gliding. In the case of fast flex-gliding, the camber of the inner part of the wing is not only decreased, but actually abolished. When a cheel is gliding with wings extended, the posterior margin of the wing (formed by the free ends of the secondaries) forms a straight line. When flex-gliding, the posterior margin is no longer a straight line, but forms a curved line with the convexity upwards. In cheels, when flex-gliding, the relaxation affects mostly the more centrally-placed of the secondaries. In vultures, when flex-gliding, all the secondaries appear relaxed to the same extent.

The evidence in my possession goes to show that a particular amount of flexing of the wing and relaxing of the secondaries corresponds to a particular speed. For instance:—

August 28th, 1910.—At 11.40.—A vulture slow flex-gliding with wings slightly flexed, was seen to make a double dip. During the up stroke of this double dip, the wings were seen to acquire extra flexing. This extra flexing was retained, and was followed by an immediate increase of speed.

If, as frequently happens, flexing is increased without a double-dip movement, then the consequent increase of speed is gradual instead of almost instantaneous, as in the above case. That the increase of flexing in such cases is accompanied by increase of relaxation of the secondaries will be proved on a later occasion.

The above facts give a further insight into the nature of flex-gliding. It is now necessary to consider facts that prove that more energy is required for flex-gliding than for circling.

I have observed several instances in which the development of cloud shadow (in Agra), in cases in which the sun is only obscured by a thin layer of cloud, may cause flex-gliding to cease, while permitting birds to continue circling. Though I have only recorded a few such cases, it is probably not an infrequent occurrence. An unaccustomed observer, on seeing circling with gain of height, going on in the absence of sunshine, might infer that cloud shadow has no effect on soaring. I was for some time in this position, and it was only after more lengthy experience that I realised the different effects of thin cloud shadow on circling and flex-gliding.

Examples of decrease of soarability of this nature are as follows:—

March 9th, 1910.—At 12.10.—Wind north. Leaves still. A thin layer of cloud. No birds up except cheels. These were either circling or flex-gliding. No ease-gliding seen except apparently on windward side of fort.

12.30.—Still cloudy. Scavenger vulture seen circling, with occasional flapping.

12.34.—Sunshine.

12.35.—Cheels seen flex-gliding, but with loss of height. No flex-gliding had been seen previously.

March 12th, 1910.—At 3.0.—Thin cloud, but sun making faint shadows. Heat eddies strong. Vultures were flex-gliding and circling.

4.0 to 5.0.—Stronger cloud shadow and heat eddies ceased. Vultures, if at low level, were flap-gliding. If at higher level, they were circling.

July 22nd.—At 8.15.—Cheels near me had been flex-gliding. Shade came over. Then the cheels that were flex-gliding tightened their secondaries, but for a little time continued gliding up wind. Then they ceased such gliding, and confined their movements to circling, or if at low level to flap-circling. A little later flex-gliding at high level was seen.

In this last case, so long as sufficient air energy was available, the cheels were flex-gliding at high speed with secondaries relaxed and with wings strongly flexed. When, owing to the development of cloud shadow, less energy was available, the cheels at first decreased the flexing of their wings and the relaxation of their secondaries, and flex-glided at lower speed. Then, as the available energy continued to diminish, they extended their wings still further, and with a further decrease of speed began circling.

It might be thought that this last observation proves that the bird has some mysterious power of knowing how much air energy is available, and that in consequence it can trim its wings accordingly. Though I have no wish to allow abstract speculation to obtrude on this record of observations, I may briefly state my opinion that the facts now described prove nothing of the kind. For, as will be apparent in later chapters, existing evidence goes to show that the centre of effort of the wings bears a different relation to the centre of gravity according as the bird is or is not taking energy from the air. Thus the only assumption necessary is that the bird is aware when it

is losing its balance, and that it can recover or preserve its balance by appropriate adjustments. Some of these adjustments have been already described; others will be described in later chapters.

The following is a case of flex-gliding observed in Naini Tal:—

June 21st, 1910, at 12.57.—A vulture seen flex-gliding up wind at 20 metres per second and at a height of 800 metres above my point of observation. This was on Sherka Danda, at a point 7,400 feet above sea level. After passing over me it glided in and out of thin cloud. Several clouds were near, but the sun was shining. Wind light, occasionally moving leaves.

In Naini Tal, whenever the air had full soarability owing to the presence of bright sunshine, vultures could be seen circling up to a height of several hundred metres above the mountains. When they had thus reached a sufficient height they would flex-glide away, and could sometimes be seen thus gliding for several miles before they went out of sight.

(To be continued.)

AIR EDDIES.

E. V. B. FISHER still manages to retain a happy and more or less contented face, even though the arrival of his new "bus" has been so long delayed.

However, it should not now be long before the Vickers II is seen at Brooklands, as during the week "E. V. B." is going over to the works at Erith to take charge of the new machine. It is likely that preliminary tests will be carried out at Dartford before it makes its *début* at the Weybridge course.

The Rev. Sidney Swann, M.A., who will be remembered as having carried out experiments with a biplane of his own construction at the Aintree Racecourse, near Liverpool, some eighteen months ago, has, since he abandoned the fascinations of flight, distinguished himself in other directions. Just recently he succeeded in lowering the record for rowing the Channel, in a light skiff, from 7 hrs. 15 mins. to 3 hrs. 50 mins. This, for one who has seen fifty summers, is no mean performance.

In my opinion, it would be well nigh impossible to find a constructor possessing a more complete grasp of his subject than does Howard Flanders of Brooklands. Indeed the way in which his monoplane carries passengers with the 60-h.p. Green seemingly at half-throttle is sufficient evidence of his worth as a designer. I should have thought that he would have made an attack on the Michelin prize ere now, but apparently he is not yet quite satisfied with its running, as he intends to spend another week or two in adjustments.

Awfully particular chap, Flanders!

Henry Farman is nothing if not vigorous as a designer, for he seems to produce new machines on the average of about one a month. His latest product is a biplane of a "Light Military Type." The front elevator and outriggers have been revived, extensions are still fitted, and the number of struts in the *cellule* has been reduced from 16 to 12. Farman has also effected a change in his landing chassis, for it now presents a track of no less than 14 ft., while 4 vertical chassis-struts replace the eight originally employed.

It is a peculiarity of the Farman brothers that while Maurice is gradually approaching the "aerobus" in each design he produces, his brother Henry undoubtedly favours the biplane which possesses the lightness, the rapidity, and general handiness of the monoplane. Henry Farman is really not far wrong, for the advantages of an aeroplane from a military point of view are not solely confined to weight-lifting, but include such factors as speed and portability.

In the matter of radius of action there is not much to choose between the two machines, for whereas the Maurice Farman biplane can carry loads of petrol, and keep plodding along, Henry Farman's new machine need carry much less fuel in travelling a similar distance in shorter time. By-the-way, I wonder what has become of the Henry Farman monoplane.

Some of our waggish aviators simply cannot give up the awful habit of wagging when they are not flying. While discussing, the other day, the merits and demerits of fostering the growth of mustard and cress on the under surface of aeroplane wings, in order that they may constantly work in the upward "*remous*" caused by the action of the sun on green vegetation, one such person cheerfully

volunteered the suggestion of "doping" the wings with a paste made from *self-raising* flour. With such ingenuity the days of the helicopter should not be far ahead.

Poor Charles Hubert, who recently suffered injury to the extent of two broken legs in a fall on a Military Farman at Hendon, has been taken from the Central London Sick Asylum to St. Mary's Hospital, Paddington, where he is progressing favourably. On the day after his smash Hubert got busy dictating replies to the many messages of sympathy that he had received.

Evidently Grahame-White is determined to embark upon the construction of aeroplanes on a large scale, for in two of his hangars at Hendon he is laying down a fairly complete plant of power-driven wood and metal working machine tools. A third shed is destined to become an erecting shop. Let us hope that he will meet with as much success in his new expansion as has hitherto been his.

"There is at least one man who never brags of his descent—the aviator."—*Satire*, New York.

In some cases, perhaps; but there are aviators to be found who are not altogether affected by an acute fit of depression when you ask them to recount the story of a "rather good crack-up," especially if they have been lucky enough to come out of it without personal injury.

The new monoplane under construction at the Martin and Handasyde shed at Brooklands is taking an aeroplane-like form and, if all goes well, should be ready for its trials by the end of the month.

Frank Champion is still doing well out in Southern California. The other day he flew from Oceanside to his home at Long Beach, a distance of eighty miles in fifty-five minutes.

A newspaper report which he sent me describing this flight is more than usually interesting compared with most of the accounts that are written about cross-country flights. After making the assertion, "Hitching his aeroplane to a post he went in for breakfast," the journalist proceeds to venture the opinion that "aeroplaning, even more so than *automobiling*, gives the partaker a hearty appetite."

Mr. Barber the designer and constructor of the well-known Valkyrie aeroplane, is at present in Paris, he having been approached in several directions, not only in France but in Austria, in connection with establishing constructional works for his particular machine in those countries, and the inducements which are being offered him in this respect are such as to probably incline him to take the matter up seriously. He, like most other British constructors, has received extremely scant official encouragement in this country, and it is hardly surprising therefore that those who are anxious to see the science go forward with greater strides should find an outlet for their work under more encouraging and congenial conditions than at present prevail on British soil. On the Continent, full appreciation is given to the future of the aeroplane and official encouragement with the leading Governments is as conspicuous there as indifference is conspicuous in official quarters in this country.

"OISEAU BLEU."

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

THERE is not a great deal to report, but a first trial has been made, as mentioned below, with the new Short double-engined biplane, fully described in the issue of *FLIGHT* of the 9th inst.

On Sunday evening the new Jezzi biplane was out for the first time, its owner giving it a run over the ground by way of testing the efficiency of its rolling gear and rudder control before essaying a flight.

The trial was entirely successful, the chassis proving itself well able to negotiate the roughest part of the ground with the machine at full speed, and the rudder control also proving very effective. At first sight Mr. Jezzi's new machine is strongly reminiscent of the Breguet, but is much smaller and entirely built of wood. The total span of the top plane, including the two extension planes, which project 7 ft. at each side, is about 28 ft., the lower plane being not more than 14 ft. span. The engine is a 24-h.p. Jap, which drives a tractor-screw. The aviator sits in the fuselage tail, at a point immediately below the rear edge of the top plane and behind the engine and petrol tanks.

Altogether the machine is of extremely neat design and clean construction, all the fittings being simple, head resistance being done away with wherever possible. Further trials will be watched with interest at Eastchurch.

On Monday Mr. F. C. McClean made the first trial flights in his new Short twin engine biplane, the flights proving very successful, and the machine answering fully the expectations of its constructors. The first trial was made by Mr. McClean alone, who made a short straight flight, in which the machine showed great buoyancy, rising rapidly into the air in spite of the preliminary run being uphill.

Afterwards, with Lieut. Samson on board, Mr. McClean made eight laps of the ground in which he frequently flew with either engine throttled down. A strong feature of the tactics was the large margin of power exhibited by the machine in flight, it being possible to vary the speed considerably, by throttling down either or both engines without causing a descent.

Mr. McClean stated afterwards that he found the warping control very effective and the biplane very steady in flight; it also showed a very flat gliding angle, when the engines were cut off, in this respect, strongly reminding one of the Nieuport monoplanes at the last Gordon-Bennett Race. The speed was estimated at 52 to 54 m.p.h.

The two Valkyrie machines, presented to the Navy by Mr. H. Barber, have now arrived from Hendon, Lieut. Samson having superintended the conveyance of them to the Eastchurch grounds.

Brighton-Shoreham Aerodrome.

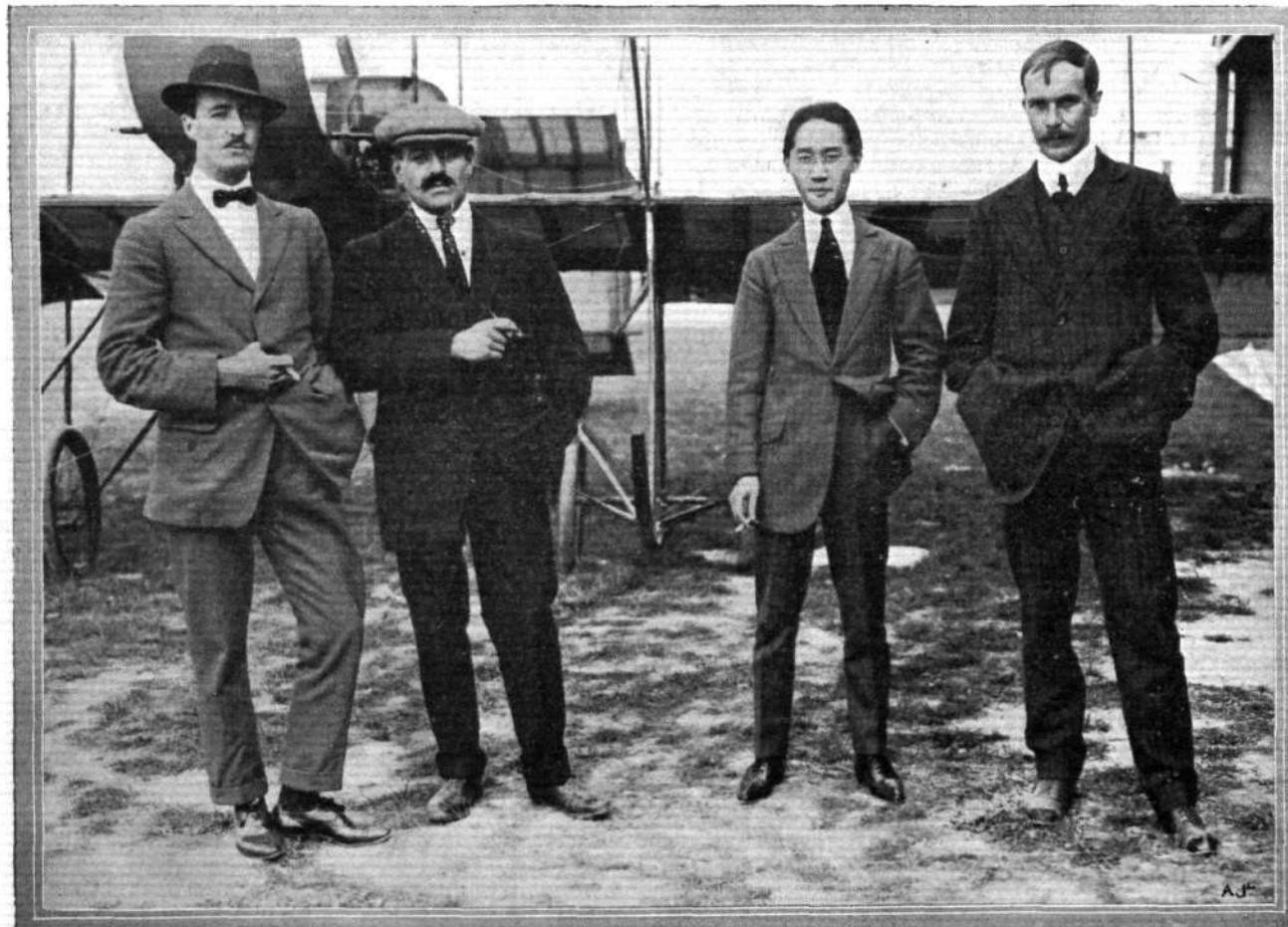
ON Tuesday Mr. J. Valentine paid us a surprise visit about 5 o'clock, intending to have a fly to Dover, but his machine was not quite ready. An hour later it was brought out, although the wind was blowing a good 20 miles, and darkness had begun to set in. Not wishing to disappoint those waiting for him at Dover, he started off at 6.10 with a very fine ascent, and attaining an altitude of about 1,500 ft., he headed for Dover. Finding the wind a little tricky, and darkness coming on more rapidly than he had anticipated, he decided to return, regaining the aerodrome with a splendid *vol plane*, landing without a hitch at 6.25.

Negotiations are in progress with a view to arranging a non-stop aeroplane race from Brighton-Shoreham Aerodrome to the Crystal Palace and back.

Brooklands Aerodrome.

THE wise ones at the meteorological office declared that the weather would break up on Thursday. Consequently the weather, in order to live up to its reputation of uncertainty, turned out bad on Wednesday, and rude Boreas reigned supreme. However, the Flander's conspiracy, always on the lookout for a calm, just managed to get in two or three circuits on Wednesday last week as we were going home to dinner.

Thursday was somewhat better, though as our American cousins say, "Nothing to write home about." Louis Noel was the first to



AT THE FLYING SCHOOL OF THE BRISTOL COMPANY AT SALISBURY PLAIN.—From left to right: Lieut. Newall, of the Indian Army, a pupil; Mons. H. M. Jullerot, Manager of the Bristol Co.; Mr. Z. Y. Lee, a Chinese pupil; and Mr. Howard Pixton, the expert aviator who has recently transferred his work from Brooklands to Salisbury Plain.

go out on the Avro-Farman; he did several circuits in excellent style, notwithstanding a tricky wind, ranging from 10 to 25. His tussels with the river *remous* were worth watching—the machine dropping like lead for ten feet at a time. Pizey then ventured out, and gave an excellent exhibition on the new Bristol, doing short circles and banking to a big angle. Friday morning was a busy one, the weather being fine and almost calm; a thick haze lay all over the ground until the sun rose, when it dispersed. Hunter attempted his ticket on the Avro-Farman, but as the wind was rather tricky and the engine not pulling very well, he only did his eights and left the altitude for Saturday morning. Capt. Richey was out on the Bristol, doing eights and showing complete control of the machine. The evening was rather gusty, and the only flying was done by Pizey and Fleming on the Bristol and Spencer on the Spencer-Farman. On Saturday quite a good crowd turned up, but owing to bad weather only a little flying was witnessed. Noel was out on the Avro-Farman, flying very well indeed. His landings are much improved. Fleming flew round a few times, and Spencer gave a little exhibition of banking and steady flying.

On Sunday morning the weather proved ideal. The Avro biplane was out piloted by Raynham, it rose quickly to 400 ft., and then did some quick turns and finished by a fine *vol plané*. Ducrocq was out flying high and making little excursions over the surrounding country. The Flanders monoplane was out, with Kemp at the helm, flying very steadily and fast. In the evening nearly everyone of any importance was out. Porte started off with a few circuits on the Deperdussin, Spencer followed with a fine flight, and then Raynham took the Avro up to 600 ft. in a very short space of time. Spencer Grey, one of the old Blondeau pupils, was flying the Avro-Farman, which he had hired for the evening. Noel was also out, and did some good circuits.

The Bristol people were out in force, carrying various passengers. On Monday morning the Deperdussin School was also out. Garne did some good straight flights. Chataway, who, by-the-bye, is not an Egyptian, although he has resided in Egypt a great deal, was rolling, and Cadet Robinson was making short flights. The Avro biplane ascended and made some good flights outside the track piloted by Raynham. Ducrocq made a fine flight at about 400 ft., and the Bristol instructors were busy with their pupils. In the evening the Avro biplane was out and quickly rose to a height of two or three hundred feet. After doing a few circuits an involuntary descent was made on the track just close to the paddock, owing to a stopped petrol pipe. After putting this little defect right Raynham ran the machine along the track, turned, and rising easily flew back to the sheds. Captain Richey was out on the Bristol doing figures of eight at a very good height. He is going to see if he can successfully transmit information to a brother officer on the ground by means of arm waving. He will of course occupy the passenger seat. Barber would be a useful man for this, as I have frequently seen him waving his arms about whilst flying to demonstrate the stability of his machine. Fleming took the Bristol up for a few circuits, and then afterwards took as passengers Mrs. Stuart, the wife of one of his pupils. Pashley was again on the Universal Aviation Sommer. He did two or three circuits and then decided to go for his ticket, he succeeded in doing half before darkness set in.

However, he passed his test on Tuesday morning. He was flying very high, about four hundred feet, I should think, and although a side wind was blowing, was very steady.

The Flanders' monoplane was flying piloted by Ronald Kemp. He first of all took Mr. Howard Flanders for a short trip and then Mr. Garne of Deperdussin school. The other day Mr. Flanders timed the machine round the track to do 65 m.p.h. It sounds a lot, but I can fully believe it after having seen the machine in the air a number of times.

The Deperdussin *brevet* machine was out, piloted by Gordon Bell. He flew circuit after circuit until dark, when his path could be traced by the flashes at the exhaust-ports. Spencer was out on the Spencer-Farman, taking passengers after having cleaned his Gnome for the first time. Rippin had the Hanriot out and made a number of straight flights, rising to a good height and planing-down in expert style. Lieut. Harford had the "Big Bat" out, and was rolling on it; I expect he will learn to fly on this pretty quickly, as it is a passenger-carrier, and the instructor can sit by his side. On Tuesday morning the Avro staff were the first to arrive; they just shoved the machine out, started the engine, and Raynham flew off to Hendon. It was a glorious morning, and as the machine rose a hundred feet or so it caught the first rays of the rising sun and was bathed from tip to tail in blood red. It made a very fine picture. Raynham arrived at Hendon without mishap, and will start for the Michelin, weather permitting, on Wednesday morning. Shortly afterwards, we observed a huge sausage-like shape above us, and identified it as the "Gamma" from Farnborough. It sailed round the ground at about 700 or 800 ft., and then went straight off in the

direction of home. One could not help thinking what an easy mark it would make for a gunner, even if two or three times the distance away. It seemed very steady, but rather slow.

The Deperdussin pupils were making great strides. Garne is to be promoted to the *brevet* machine, and Chataway and Cadet Robinson were doing straight flights. Shortly after 6.30 the Walton and Edward's elephantoplane was brought out and made a short run, some little defect was discovered so operations were postponed. Capt. Richey was again upon the Bristol. Afterwards he went up as passenger with Pizey to about six or seven hundred feet, finishing with a fine *vol plané*. Rippin was again doing straight flights. He intends doing a circuit shortly. In the evening, the only machine out was the Bristol piloted by Fleming, who made two flights of one or two circuits each. The wind was very bad and the flying was distinctly sensational. However, he landed safely, and I think every one was glad when he did.

Lanark Aerodrome.

THE weather all last week was ideal, and every day flying was in progress from early morning till dusk. Consequently a feeling of cheerfulness invaded the school, the pupils, without exception, making splendid progress. While Mr. Forson is "hopping," Messrs. Jackson and Warren are rapidly making themselves proficient for the *brevet* test. Mr. H. Archer Neild, of London, who only joined the school on the Monday, has now quite confidently reached the "straight flight" stage. Observers have been appointed, and everything is now in readiness for passing the tests for the first certificates of the R.A.C. to be won in Scotland.

On Thursday Mr. Ewen on the Deperdussin made two flights of 10 mins. and half an hour, while on Friday he paid a visit to Carstairs, 5 miles off, and afterwards executed some figures of eight, flying for the benefit of the pupils.

On Saturday he again made a 20 mins. flight, passing round Lanark and Cleghorn.

Liverpool Aviation School, Sandheys Avenue, Waterloo.

MR. DUKINFIELD-JONES, on Saturday last week, was out with the intention of trying for his *brevet*, but after describing two figures of eight decided to come in as the wind was exceedingly puffy. Later on Mr. Hardman was out rolling, and made several very satisfactory straight lines notwithstanding a nasty cross wind.

Next day, before breakfast, Mr. Jones ascended, and after describing one circle, came down and signified his intention of flying for the final test for his *brevet*. This he completed in grand style, flying not more than 150 feet high owing to a thick haze which was rising, which made it difficult to see the turning post. He finished his five figures of eight with a fine *vol plané*, coming to rest two yards from the finishing mark. His total time in the air was 14 minutes. After he had completed the test Mr. Jones gave an exhibition flight for the benefit of those present, flying at a good height in the semi-mist to Seaforth and back, a distance of over two miles, coming down with a spiral *vol plané* and landing at the doors of the hangars. Mr. Jones has now proved himself a very reliable aviator, and with the experience he has gained in cross country flights as passenger with Melly, should have no difficulty in making a name for himself in the near future.

Since the accident to the two-seater at Manchester the machine has been entirely reconstructed, and the engine tuned up, the final touches having been put to it on Monday. Mr. Melly is now only awaiting fine weather to resume exhibition flying and passenger carrying.

Salisbury Plain.

Bristol School.—The morning of Monday last week was very windy, and on Busteed and Pixton going up for trial flights they found the conditions too bad to permit of any tuition work. In the evening the wind dropped considerably, and flying was started by Pixton taking up a passenger, who was afterwards taken for another trip by Busteed. Lieut. Newall then made two very fine solo flights, each lasting about ten minutes, rising to heights of 100 and 250 ft. respectively, during which he showed splendid control of his machine. After this Lieut. Watts ascended for a solo flight, reaching a height of 80 ft., and remaining up for over ten minutes. Captain Steele Hutcheson and Lieut. Strover were next sent for their first solos, which they carried out in remarkably good style. Captain Steele Hutcheson's flight lasted 12 minutes, during which he performed a right-hand turn, and a *vol plané* from about 200 ft. Lieut. Strover's flight lasted eight minutes. He also did a good right-hand turn, and finished with a *vol plané* from about 150 ft.

The following morning Pixton went up to test the conditions, and both he and Busteed, who followed him, found a fairly strong wind going, but it was not considered bad enough to prevent school work. The morning's work was, therefore, started by all the pupils practising right-hand turns. Lieut. Strover then did two ten-

minute solo flights, as also did Capt. Steele Hutcheson, the second at a height of 350 ft. Solo flights were also made by Lieut. Watts, 13 minutes, and Lieut. Newall for 8 minutes, all the pupils showing evidence of good progress. Busteed next took Lieut. Cross for a long cross-country flight, and then Lieut. Cross took charge of the machine himself, and gave Busteed a passenger ride.

On Wednesday week there was heavy rain with a nasty wind all day, and as things got steadily worse as the day wore on no flying was possible.

On Thursday morning the wind was still fairly high, but Gilmour was out giving lessons in the art of *vol plané* to Mr. Lee, Lieuts. Newall and Cross. Jullerot made an ascent in the evening, to try the weather conditions, and Mr. Lee was then sent out for a solo flight. He made one wide circuit at a height of 150 ft. Lieut. Joseph was next out for a solo flight, and afterwards Lieut. Newall started to make the necessary tests to qualify for his certificate, being observed by Capt. Fulton. He came down half way, however, owing to slight engine trouble. This was put in order and Jullerot made a trial, but the approach of darkness prevented the Lieut. from making another attempt. Gilmour carried Mr. Smith Barry and Lieut. Joseph for lessons in *vol plané*, afterwards taking a passenger for a flight, while Busteed gave a flight to Lieut. Hooper, a new pupil.

Friday morning was very windy, Jullerot and Pixton, after short flights, agreeing that the weather was too bad to permit of tuition work, and instruction was, therefore, given on the machines in the hangars.

The wind had not abated on Saturday morning, and it was deemed inadvisable, therefore, to attempt any flying. By the evening, however, conditions had somewhat improved, and Jullerot started out for a trial, with Pixton following closely behind him. They found a steady wind blowing, but it was not considered enough to impede the evening's work. Gilmour then made a flight with a passenger, while Busteed took up Mr. Smith Barry for ten minutes, and Lieut. Hooper for two flights of the same duration. Lieut. Joseph then ascended and carried out a solo lasting for fully twelve minutes, during which he gave a really good exhibition. Mr. Lee also made a solo flight last fifteen minutes, and Lieut. Watts was up alone for about six minutes.

When Jullerot and Pixton took the air on Sunday morning they found the elements absolutely perfect for flying, and tuition work was started by Pixton taking Lieut. Hooper. Following upon this, Busteed also carried Lieut. Hooper for a flight of 15 mins., this same instructor afterwards taking up an ordinary passenger. A good exhibition was then given by Lieut. Watts. He made two solo flights, lasting for 12 and 8 mins., showing excellent skill in making "figure eights." Mr. Smith-Barry also went out for a solo of 15 mins., and after circling round he finished with a *vol plané* from 200 ft. Meanwhile Mr. Lee made a solo flight, being in the air for about 10 mins., and coming to earth by means of a *vol plané* from about 200 ft. A similar descent by Capt. Steele Hutcheson, after a flight of about 10 mins., brought the day's work to a close.



The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 19th inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Capt. Bertram Dickson, Mr. F. K. McClean, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, Sir Charles D. Rose, Bart., M.P., Mr. A. Mortimer Singer, and Harold E. Perrin, Secretary.

Late Lieut. R. A. Cammell, R.E.—Before proceeding with the formal Committee business, the Chairman referred to the sad accident which befell Lieut. Cammell on the 17th inst., and it was unanimously resolved that a message of sympathy be sent to his relatives upon the heavy bereavement they have sustained.

Late Monsieur E. Nieuport. It was unanimously resolved that a message of sympathy be transmitted to the Aero Club de France on the loss of their distinguished aviator, Monsieur E. Nieuport.

New Members.—The following new Members were elected:—Walter Laurence, W. J. Salin, D. Corbett Wilson.

Aviators' Certificates.—The following aviators' certificates were granted:—

136. John Brereton (Bristol).
137. Albert Hunter (Farman).
138. Alfred Dunkinfield Jones (Blériot).

Airship Pilot Certificates.—The following airship pilot certificates were granted:—

7. Lieut. A. E. Fox, R.E.
8. Capt. E. M. Maitland.

F.A.I. Conference.

The meeting of the Federation Aeronautique Internationale has now been fixed to take place at Rome on November 1st to the 4th next.

Aviators' Certificates.—At the present time Aviators' Certificates can only be granted to candidates of at least eighteen years of age. The Committee of the Royal Aero Club has decided to recommend to the Federation that the age limit be reduced to seventeen years.

British Empire Michelin Cup (No. 2).—Intending competitors are again reminded that the Competition for this year closes on October 15th.

The only flight so far recorded is that of Mr. S. F. Cody, on September 11th.

Entries have now been received from F. P. Raynham (Avro biplane) and Ronald C. Kemp (Flanders monoplane).

COURSE.—Competitors may select their own circuit of 125 miles, but the start must be made from a flying ground approved by the Club,

and the proposed circuit must be submitted to the Club before the flight is made. The rules stipulate that three clear days' notice must be given to the Secretary of the Royal Aero Club.

In addition to the courses already published, the following circuits have been approved:—

Laffan's Plain	Shoreham Aerodrome	Manchester (Trafford Park)
Andover	Winchester	Wigan
Reading	Brooklands	Morecambe
Hendon	Shoreham Aerodrome	Frodsham
Brooklands		Manchester (Trafford Park)
Laffan's Plain		

Late Lieut. Cammell.

The funeral of the late Lieut. Cammell, with full military honours, took place at Aldershot on Thursday last, the 21st inst.

Among the many floral tributes was a wreath expressing the deep regret and sympathy of the Committee and Members of the Royal Aero Club, which body was represented by Mr. Roger W. Wallace, K.C., Chairman, Mr. Mervyn O'Gorman, and Mr. Harold E. Perrin, the Secretary.

Late Hon. C. S. Rolls and Cecil S. Grace.

Several residents at Eastchurch have expressed the wish to place a stained glass window in the Church at Eastchurch, in memory of the late Hon. C. S. Rolls and Cecil Grace, both of whom made their first experiments in flying in the district.

Contributions previously acknowledged	£	s.	d.
G. B. Cockburn ...	52	7	6
J. T. C. Moore-Brabazon ...	5	0	0
Hon. Hubert Beaumont ...	5	0	0
Wilbur and Orville Wright ...	2	0	0
Griffith Brewer ...	5	5	0
Lieut. F. L. M. Boothby, R.N. ...	2	2	0
Lady May Boothby ...	1	0	0
E. Pitman ...	2	2	0
A. Mortimer Singer ...	5	0	0
Total	80	16	6

Members wishing to contribute are requested to communicate with the Secretary of the Royal Aero Club.

HAROLD E. PERRIN,
Secretary.
166, Piccadilly.

THE AERONAUTICAL SOCIETY.

A SPECIAL meeting of this Society will be held at 8 p.m. on Monday next at the Royal Society of Arts, John Street, Adelphi, for the purpose of passing a complete set of new rules and electing a new Council. It is, therefore, of the utmost consequence that every member of the Society should make a special effort to attend in order to record his vote.

It will be remembered that a special meeting was held a little while ago to receive the report of the Committee of Inquiry that was appointed at the last annual general meeting. On that occasion the only useful business accomplished was the acceptance of the four main principles that the Committee put forward as the basis of their report. These principles were as follows:—

1. That it is necessary to the financial welfare of the Society that the Society should attract the support of all those interested in aeronautics, irrespective of their technical qualifications.

2. But that it is equally necessary to the standing of the Society as the officially recognised body dealing with the *science* of aeronautics, that the constitution of the Society should include a technical side, to which none but those qualified in the science of aeronautics shall be eligible, and admission to which would, therefore, automatically confer a technical status on those elected.

3. That the governing body of the Society shall be elected by a postal ballot taken in accordance with the methods adopted by modern institutions.

4. That provision should be made for limiting the liabilities of members to amounts that shall be covered by their subscriptions.

This report of the Committee of Enquiry was accompanied by a memorandum containing proposed new rules drawn up with a view to giving effect to the above principles, and after the meeting a joint conference of the Council and the Committee of Enquiry was held to discuss these details. An agreement was arrived at on all essential points, so the rules about to be put before the Society are, therefore, to all intents and purposes identical with those submitted to members individually prior to the last special meeting. Since they are now to be presented under the double *egis* of the existing Council and the Committee that may be said to voice the opinions of the reform party, it is to be hoped that individual members will not baulk this attempt to restore the welfare of this ancient institution by standing in the way of their adoption.

It is absolutely essential that the Society should have these new rules, for any attempt to patch those already in existence would inevitably lead to hopeless confusion and ultimate dissatisfaction. The truth of the matter is that the existing rules, like the existing Council, are hereditary.

Under the proposed new rules, provision is made for the proper nomination of members of Council, and their election by postal

ballot, by which means a thoroughly representative control is ensured.

Moreover, the Society is in future to be so constituted as to differentiate between its technical and lay membership, and its government will rest jointly in the hands of a Council drawn from both sections. The proportionate representation on this Council is the sole detail on which the conference of the existing Council with the Committee of Enquiry failed to agree, and this point, really of minor importance, is to be put before the meeting on Monday. The Council itself, it is proposed, should number sixteen in addition to the President, and it is merely a question as to how many of the sixteen shall represent the technical side. The Committee of Enquiry recommend that the representation should be equal.

For the time being it is, however, more important to obtain a properly elected council than to trouble about its detail constitution, and in any case the technical side in the Society has yet to be created. For this reason it is proposed to elect a new Council at the meeting on Monday from a list of nominations made in advance in accordance with a notice duly given to members.

The creation of the technical side of the Society is a move that should be fraught with the greatest importance to the whole profession and industry of aeronautics, for it is intended that the new titles of Fellow and Associate Fellow should only be conferred on those who have attained to a considerable eminence or to an acknowledged position in the science.

Another very important and especially desirable move is the encouragement of serious study in aeronautics among the rising generation by the creation of a students' section, which is to be reserved for those who are receiving technical training such as will fit them in due course to become Associate Fellows.

The lay membership of the Society remains in principle as it is at present, but has been extended to admit Associate Members at reduced fees. The Aeronautical Society has always been a lay body, notwithstanding the attainments of some of its members, for election has in no sense been intended to confer a technical status as it does in the case of most of the leading institutions that seek to foster the interests of recognised professions. It is very essential that the membership of the Aeronautical Society should continue and grow apace, for without such support it is impossible that the Society can exist, far less do good work. But, considering that the Aeronautical Society is 45 years old and has such honoured and historic associations with the past, it ought not to be asking too much of the public that they should show some practical interest in maintaining its dignity to the credit not only of Great Britain, but of those great men in the past who had the courage of their convictions that flying, as we now know it, would some day come to pass.

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PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of

FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Birmingham Aero Club (62, ALBION STREET).

THE Rt. Hon. Lord Norton has accepted the Vice-Presidency of the club with the intention of developing exhibition flights at Billesley Farm, and forcing aviation more to the front in the Midlands. On the 16th at the usual weekly competitions for models, Mr. E. Trykle with a large 6-oz. model succeeded in getting a flight of 84 seconds' duration. The time was carefully recorded by Mr. B. W. Beeby in the presence of other officials.

East London College Ae. Research Soc. (MILE END ROAD, E.).

OWING to the generosity of Mr. P. Y. Alexander and of the Governors of the East London College, the Aerodynamical Laboratory in that college will again be open during the winter for experimental research.

The Council of the Aeronautical Research Society would gladly welcome a few gentlemen desirous of experimenting. Application for admission to the Society should be made to the honorary secretary.

Leicester Aero Club.

SIR SAMUEL FAIRE presided at a meeting of the general committee of the club at the Grand Hotel on the 8th inst. Quite a large amount of interest in aviation matters has been aroused in the locality as a result of the passage of the competitors in the *Daily Mail* Circuit of Britain. Several members are actively engaged in building full-sized machines as well as models, and it is hoped that exhibition flights will shortly be made on a locally-built machine by a member. The details regarding these flights will be discussed at another committee meeting to be held shortly.

Parkside Aero Club (2, EDBROOK ROAD, PADDINGTON).

THERE are still a few vacancies for members, but those intending to join this club should note that only workers are required, the members being banded together with the very definite object of studying aviation problems, and this is the only subject which is discussed at meetings. The glider and full-sized machine will be at the members' disposal next week at the club's private ground, and further particulars can be obtained from the secretary. Model makers would be welcomed in any numbers to join the new Paddington Model Aero Club, which is quite distinct from the Parkside Aero Club. They should apply to the Model Secretary.

MODEL CLUBS.

Aero Models Association.

THE A.M. Association are holding the following open model flying competitions:—

Sept. 30th.—Northern Branch. 3 p.m., at Messrs. Vivers and Sons, Lodge Dairy Farm, Bishop's Avenue, E. Finchley. Latest date for entries, Sept. 29th.

Oct. 7th.—S.E. Branch. 3 p.m. on the Golf Links, Mitcham, Surrey. Latest date for entries, Oct. 6th.

Full particulars may be obtained upon application to the A.A. and M.U., Caxton House, Westminster.

Blackheath Aero Club.

THE above club held two very successful meetings this week, when the majority of the members brought their models and some splendid flying was witnessed. The Steering Competition resulted in a win for Mr. Clark with Mr. Rippon a good second.

Several "rising from the ground" models were in evidence, the flights made by Messrs. Hunt and Rippon being greatly appreciated by the numerous spectators. Mr. Clark again had the misfortune to lose a model, his No. 37 apparently being intent on a birds-eye view of Blackheath village.

Meetings have been arranged for Saturdays September 23rd and September 30th at four o'clock in the middle of the Heath as usual, and on the former date an open competition from models "rising from ground" combined with distance will be held.

The entrance fee will be 6d. for each model, which will be divided as prizes. Competitors can enter their models any time before 4 p.m. on the day of the competition.

Bexhill Model Aero Club.

AN open model competition was held in Egerton Park on Wednesday the 13th inst., in connection with the Dog and Pet Show. The results were:—1st, Hiscox; 2nd, Hill-Reid. Duration: 1st, Hill-Reid, 33 secs.; 2nd, Gwynne, 32 secs. The flights were very spectacular, some of the models rising as high as 50 ft., and as usual some tree climbing had to be carried out. A silver cup for the best all-round machine was won by Gwynne who used a Mann monoplane, while the prize for the best workmanship in the Exhibition was won by Hiscox with a model of his own design.

Conisborough and District Aeroplane Soc. (18, CHURCH ST.).

ON Wednesday, Sept. 13th, it was decided at a meeting of the above to hold another flying meeting on Saturday, Oct. 7th, when numerous prizes will be put up for competition. Whilst staying at Filey one of the members (B. Clarkson) had the good fortune to have a trip in one of the Blackburn monoplanes there. He was also at the hangars nearly every day witnessing some very fine flights, and gaining a lot of helpful information for himself and the club.

Leeds Model Aeroplane Club (5A, HULLAND ST., HUNSLET RD.).

ON Sept 9th the above club gave a very successful exhibition at Sunny Vale, Hipperholme. In the afternoon an open competition was held, when the first place was awarded to J. Whitaker, flying a Braithwaite monoplane No. 12, with a flight of 660 yards. This flight was not measured, owing to the course lying across a lake and some private property, but calculated by two local gentlemen acting as judges. The second place went to A. Beckett, with a flight of 160 yards; and the third to W. Thornton, with a flight of 110 yards. Mr. Thornton is to be congratulated on the construction of his model, for it is an exceptionally fine and steady flyer. In the evening a demonstration was given with models rising from the ground. A cross-water handicap was also held, which however was not the success anticipated. Mr. J. Whitaker's self-starter, after covering half the distance across the lake, made a dive into the water, and "hydroplaned" back to within five yards of the starting point, much to the amusement of the spectators.

Liverpool Model Aero Club (39, BROOK ROAD, BOOTLE).

A GOOD meeting was held on Saturday last, about ten models competing, but there was no flying for the Harrison prize. A. G. Pugh completed tests for his certificate, and obtained the first issued by the club, with a single-screw monoplane. Will members please note that a prize will be offered at next week's meeting? A hearty welcome will be given to members of other clubs who may be passing through the town.

Manchester Model AeC. (BROWNSFIELD MILLS, MANCHESTER).

ABOUT a year ago the Manchester Aero Club formed a model section for the purpose of studying the requirements of those interested in models. This has now been made the basis of a



The Wurtemburg Meeting.

THE flying circuit of Wurtemburg commenced on the 11th inst., when seven aviators started from Weil on the 120 kiloms. journey to Ulm via Reutlingen. Jeannin was the first to get through, his time being 1 hr. 56 mins., while Volmuller was the second to arrive at Ulm in 1 hr. 32 mins. Hirth landed at Lerchenfeld several kilometres short of Ulm owing to his petrol supply running out, but was able to complete the journey later in the day, and Hoffmann came down close by Reutlingen, as also did Schall, who broke the right wing of his machine in landing. Lindpaintner also got to Reutlingen, but Noelle and Roever, the other competitors to start, only got a few kilometres on their way before coming down. On the following day Buchner, Kahnt and Hanuschke were to have started but the first named only made a half circuit at the starting ground and then smashed up, while the other two only got just out of sight of Weil before landing. On the morning of the 13th several

separate club, as above, to carry on the useful work. Success is assured, as through the kind offices of the Manchester Aero Club, the members are allowed to use the Aerodrome at Trafford Park for model flying competitions.

Sheffield Model Aero Club (35, PENRHYN ROAD).

THE above club will hold a model flying competition on Saturday, Sept. 23rd, flying to commence at 3 p.m. prompt. All members wishing to take part in the competition must be at Malin Bridge car terminus at 2.30. This competition is limited to members only, entrance fee 3d. each. Should the weather not be suitable the competition will take place the following Saturday, same time.

Smithills (Bolton) Aero Club.

THE annual meeting of the above club was held on the 13th inst. Any youths in the Bolton district who are interested in aviation, and who would like to become members, are requested to communicate with the hon. sec., J. Scott-Taggart, Lieutenants, Smithills, Bolton.

Scottish Ae.S. (Model Aero Club) (6, MCLELLAN ST., GOVAN).

THE annual general meeting of the club was held on the 7th inst. in the rooms of the Engineers' and Shipbuilders' Institute, Elmbank Crescent, when the undernoted office bearers were elected for the ensuing year:—President, Mr. H. Lewis; Vice-President, Mr. Geo. Riddoch; Hon. Secretary and Treasurer, Mr. Wm. Foster, Rochelle, Limeside Avenue, Rutherglen; Hon. Assistant Secretary, Mr. J. S. Gordon. It was arranged to have a model flying meeting once a fortnight if possible, also a kite-flying contest, which will be held very soon. The manager of the Barrhead Flying School has very kindly given the use of the grounds at Barrhead for the flying of models. A very successful flying meeting was held at Ibrox on Saturday week. Though no prizes were offered the flying done was of a first-class order.

A model flying meeting will be held on Monday next, the Autumn holiday, at Barrhead Aerodrome, the flying ground of the Scottish Aviation Co. It is expected that the Scottish records will go by the board. Members are reminded that the first model to do 60 secs. gets its owner a passenger flight at Barrhead. Kite-flyers are specially invited to this meeting, and a competition for this class will be held shortly.

Model Aeroplane Meeting at West Hartlepool.

THE members of the West Hartlepool Technical College Experimental Engineering Society have been engaged in model aeroplane work for some time, and as a test of the progress which has been made a model aeroplane competition was held on Saturday, September 9th, on the sands at Seaton Carew. A crowd of interested spectators were present to watch the behaviour of the models in the various tests. There were two events, namely, duration and distance, the results being as follows: Greatest distance—1st, A. E. Jenner, 336 ft.; 2nd, J. Lang, 186 ft. Duration—1st, A. E. Jenner, 18½ secs.; 2nd, J. Lang, 11 secs. A rather heavy breeze was blowing, and the large models, of which a great deal had been expected, did very badly compared to the smaller models of the winners. Mr. J. W. Angles, M.Sc. (Hon. President) and Mr. T. Petty officiated as judges.

Model Aeroplanes at Bristol.

IT is proposed to hold a model aeroplane competition on the Downs, Bristol, at 3.15 p.m., on Saturday, 30th instant. Competitors meet outside "Giles" at top of Blackberry Hill. Intending entrants may obtain full particulars from Norman W. G. Edgar, 67, Redcliffe Street, Bristol.



of the competitors gave exhibition flights at Ulm. In the afternoon Volmuller, Lindpaintner, Jeannin, Schall, Noelle and Roever, Hirth and Hoffmann, the last-mentioned having completed the journey from Reutlingen on the previous evening, continued on to Friedrichshafen, a distance of 94 kiloms. According to the timekeeper's records Volmuller's aggregate time from Weil to Friedrichshafen was 2h. 49m. 39s., a few seconds better than Jeannin's time, and he was first announced as the winner; but following a protest by the latter competitor it was decided that in view of some uncertainty about the timekeeping Volmuller and Jeannin should be credited with a dead heat, and share Count Zeppelin's prize of £1,000. Volmuller was awarded the Minister of War's prize, £150, and Jeannin the King of Wurtemburg's prize. A third prize of £250 was awarded to Hirth, and a fourth prize of £180 to Hoffmann. At a banquet held on the following day Count Zeppelin presided and presented to each competitor a souvenir of the meeting.

THE AERIAL POST.

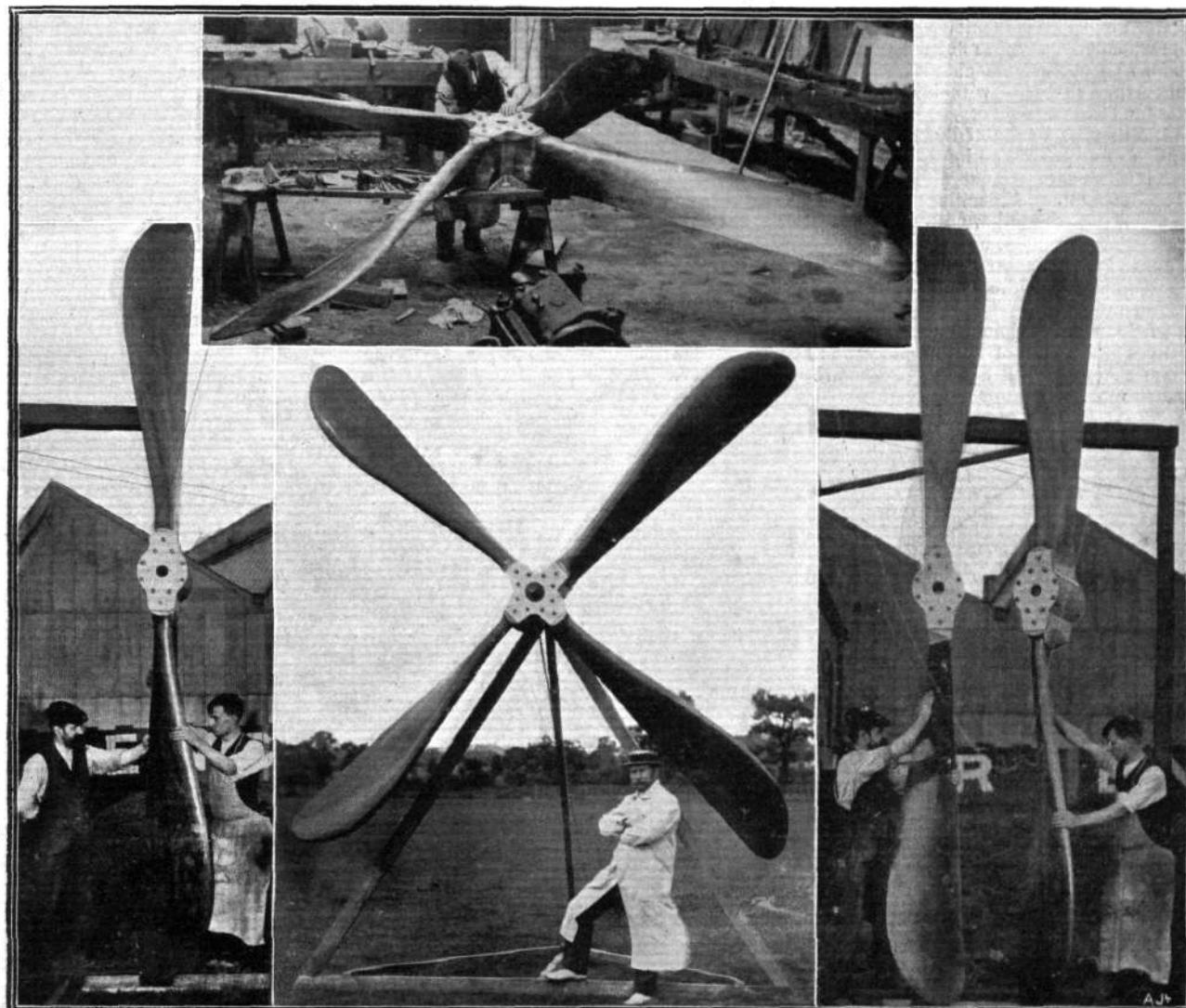
CONTINUING the story of the Aerial Post between London and Windsor from the point at which it had to be broken off in our last issue no flying was possible on the 13th inst., but Capt. Windham, as well as the Directors of the Grahame-White Aviation Co., Ltd., and the four aviators engaged in the service were encouraged by messages from the King congratulating them on the success of the service. The rain and mist which prevailed at Hendon made it impossible for any of the flyers to get away, but on the following day, although a gusty wind delayed matters until the afternoon, Greswell and Hamel flew from Hendon to Windsor, the former returning.

Mr. Hamel was compelled by a refractory engine to stay at Windsor for the night. High winds caused Friday to be another blank day, and on Saturday the flying was confined to a trip by Mr. Greswell from Hendon to Windsor with a couple of bags of mails, but on Sunday evening both Mr. Greswell and Mr. Hamel flew back to Hendon. Before starting from Windsor the two aviators were presented by the Deputy Mayor of Windsor with silver match boxes engraved with a view of Windsor Castle and the inscription: "A small memento of the first Aerial Post from Windsor to London,

September 17th, 1911." On Monday Mr. Hamel made two double journeys between Hendon and Windsor, carrying two bags on the first outward journey and one on the return. Mr. Greswell started from Hendon, but had to abandon the trip owing to a defect in his engine. The first trip by Mr. Hamel was made at 8 o'clock in the morning, the return journey being made a little after five in the afternoon. About an hour later Hamel was back again at Windsor on Mr. Greswell's machine with two mail bags, and left again for Hendon a quarter of an hour afterwards. Tuesday was bad by reason of the wind, but in spite of a stiff breeze Hamel, at 5.20, carried two bags from Hendon, returning from Windsor to the aerodrome when dusk was just setting in.

A Cross-Channel Mail Service.

UPON similar lines to the Hendon-Windsor scheme, the idea of arranging a cross-Channel postal service by aeroplane appears to be making some progress, especially in France, and it is possible that arrangements may shortly be made with Marc Pourpe, who, it will be remembered, made the double trip between England and France last month, to carry "mails" across the Channel.



A.J.

Some interesting work in propeller construction has been accomplished by the Helicoplane Flying Machine, Ltd., at Wembley, under the direction of Mr. Lorenzen, the designer. The propellers, of which the above photographs give a very good general idea, have been built under contract for the German War Department for use on dirigibles. In the case of the two-bladed type the efficiency has been certified on behalf of the German Government as being 34 per cent. above the normal. These propellers were handed to the Airship Battalion for trial purposes, and C. Erberhardt, engineer to the Imperial Prussian Airship Battalion, wrote to Mr. Lorenzen on February 14th of this year to the effect that the results of the test "enable us to confirm the fact that your three-bladed propeller exceeded the normal propelling power by 21 per cent., and that your two-bladed propeller exceeded the normal by 34 per cent. From this it is evident that from the form chosen by you for the back of the blades a considerable advance in the efficiency of aerial propellers has been made." At the moment, Mr. Lorenzen, who is seen standing in the centre photograph, is not prepared to make public any details beyond those visible in the illustrations.

THE PASSING OF LIEUT. R. A. CAMMELL, R.E.

ANOTHER sad fatality has occurred temporarily marring the triumphant progress of flight in this country and bringing home to the public the heroic self-sacrifice of these Army and Naval officers who have voluntarily, and for the most part at their own expense, devoted themselves to the perfecting of aviation in the interests of national defence.

It was while making a trial flight on one of the new Valkyrie monoplanes presented by Mr. H. Barber to the War Office that Lieut. Cammell met his death.

Throughout Sunday last he had been busily engaged in testing the new Gnome engine that had been fitted to the monoplane, and soon after 6 o'clock, when the breeze that had prevailed all through the day had moderated, he set out to make a preliminary flight on the machine. After his first circuit, during which he flew quite steadily and rose to 100 ft., he attempted a spiral *vol plané*, and this proved his undoing, for he lost control and fell to the ground.

Although some signs of life were evident while he was being extricated from the wreckage of the machine, he had breathed his last by the time he was received at the hospital.

Lieut. Cammell, who was only 25 years of age, was one of the cleverest pilots of the British Air Battalion. With the advent of the aeroplane he abandoned his work in connection with the Army dirigible balloons in favour of this more successful method.

He won his *brevet* on a Bristol biplane at the Salisbury Plain school on the last day of the year 1910, and during the following April he gained experience in piloting the Blériot monoplane, a type of machine which he had since flown with commendable success.

Last Sunday he was commencing his experience with one of the British-built Army Valkyries with a view to flying it over to his headquarters at Farnborough.

Clever pilot that he undoubtedly was, we cannot but decry the lack of caution that prompted him to attempt so much on a powerfully-engined aeroplane without previous experience in the pilot's seat of a school machine of a similar type.

Had he taken this precaution no tragedy need have happened, for he would have been enabled, under conditions of minimum risk, to accustom himself to the controls—controls which, outwardly, bear so much resemblance to the Farman, but which are so entirely different in operation.

We are sure our readers join with us in extending our sympathy to the relatives and friends of the late officer, and to Mr. H. Barber, of the Valkyrie Aeronautical Syndicate, who are deeply grieved by the sad catastrophe.



FLIGHT

Lieut. R. A. Cammell, the distinguished Army aviator who was killed at Hendon on Sunday last.

THE INQUEST.

AT the inquest held at Hendon regarding the fatal accident to Lieut. R. A. Cammell, R.E., whilst flying a Valkyrie machine, a verdict of "death by misadventure" was returned by the jury, sympathy with the relatives of the deceased and the Army being expressed. From the evidence it emerged that the actual cause of death was concussion of the brain, and it appeared that the aviator was thrown clear of the machine and struck the ground with his head, the engine in no way touching him in connection with the fall.

Lieut. A. G. Fox's evidence went to show that Lieut. Cammell had never flown this type of machine before.

Mr. H. Barber, of the Valkyrie Aeronautical Syndicate, stated that he saw the accident. He had presented the Government with four machines, three with engines and one without. This machine had had an engine in, and been thoroughly tested in the air with a 50-h.p. Gnome. That was about six weeks ago. No one else had tested it besides witness, but he had no trouble with it. The engine was taken out about a month ago, and about ten days ago Lieut. Cammell brought his engine to be put in. They had a great deal of trouble with it, and it had to be taken off and put in two or three times before the mechanics could put it right. Witness had instructed Lieut. Cammell as a passenger on a similar machine before. It was a Valkyrie, and a type quite of its own.

He thought the engine was very dirty, but he left the mechanics who were handling it alone. They thought the shaft was untrue, but he believed they convinced themselves that it was all right. In regard to the actual fatality, Lieut. Cammell commenced to fly about 5.40 p.m. It was understood he should have half an hour's practice before flying to Farnborough. He started from the north-east corner of the aerodrome, and it was at once seen that he took his turns much too sharply. After a circuit and a half he commenced to *vol plané*, and while doing so he turned sharply to the left, permitting the machine to bank up too much, whereupon it side-slipped to the ground. He thought the accident could be accounted for in connection with the control. In his machine it appeared to be about the same as on the Farman machine, on which deceased had obtained his certificate, but they did not have exactly the same effect. The accident was caused through the machine turning over. To turn on a Farman you must work levers, but in his machine, as in certain others, you must use your right foot to work the rudder, and operate the lever at the same time. It appeared to him that deceased worked his lever, but not his rudder. Lieut. Cammell was apparently trying at the time of the accident a spiral *vol plané* descent, much too much to have attempted, and that might have been the cause of the mishap.

Mr. Barber said he was very upset when he heard that Lieut. Cammell intended to fly straight to Farnborough on the machine.

Capt. Lorraine, of the Grenadier Guards, a pupil at Hendon, who saw the accident, corroborated Mr. Barber's evidence. He thought the deceased turned too sharply.

Sergeant Frederick Unwin, of the Royal Engineers, who helped to fix the engine to the machine, said that the engine was bought new but had been used several times, and after it had been repaired at Farnborough it was finally put on the machine at Hendon, and it was then quite all right. He thought that Lieut. Cammell's accident was due to his not using the control properly. The wreckage was not on him at all, he being surrounded by it, and the engine appeared to be all right. Corporal Stafford considered the accident was caused by the machine turning too sharply.

Maj. Sir Alexander Bannerman, in command of the Air Battalion of the Royal Engineers, said the deceased was a bold yet careful flyer. He was not reckless, but was a man prepared to take risks if the necessity arose. Knowing that Cammell was going to fly a machine new to him, he asked him whether he minded flying it, and deceased replied that he did not in the least, but that as it was a strange machine to him he would not fly it in a wind, as he would his own machine—a Blériot. Deceased was very fond of trying sharp turns on his own machine, and witness conjectured that deceased might have tried to do too much. With regard to Mr. Barber's suggestion as to the deceased forgetting the difference in the controls, witness said that might have contributed to the accident.

Witness added that the War Office had recently asked him whether it would be possible to have officers to fly more than one type of machine, and he replied in the negative, but as Lieut. Cammell was a very experienced flyer, he allowed him to fly this machine. The one on which the fatality occurred was the only one of the four machines presented by Mr. Barber to the Government which carried a passenger.

Dr. George Cohen, the Coroner, in summing up, said he thought that Mr. Cammell must have had some temporary loss of knowledge or control of the machine and mistaken it for another. There could hardly be any doubt he was intending to run a preliminary trial. There was no evidence to show that the machine was affected.

FOREIGN AVIATION NEWS.

R.E.P. Building a Biplane.

WE have more or less become accustomed to hearing of the production of monoplanes by such exponents of the biplane as Voisin, Sommer and Farman, but surely it is unusual to find that a well known aeroplane constructor, Robert Esnault-Pelterie to boot, has turned his attention to the construction of a double-decked machine. The new R.E.P. biplane is of the Avro type, and only differs from the R.E.P. monoplane in that two pairs of wings are fitted instead of one pair. Avro practice is recalled by the dihedral angle which the wings subtend to one another.

Round the World by Aeroplane.

AN extensive tour is being arranged by Mamet, who proposes to make a round of the world, giving demonstrations on the way on his Blériot. Starting from France he intends to fly over the Pyrenees, down the East Coast of Spain and across the Mediterranean to Algeria. From there he hopes to fly on to Egypt by way of Tunis and Tripoli. A steamship will then take the aviator to India, and after flying as far as he can there the aviator will visit Australia, South America and West Africa.

French Engine Competition.

THE list of entries for the motor competition organised by the Ligue Nationale Aérienne now number 16, a Chenu motor having been entered in the third class for engines of over 70-h.p.

Siamese Prince at Mourmelon.

AMONG the visitors to Mourmelon on the 14th inst. was the hereditary Prince of Siam, who was taken for a lengthy flight on a Henry Farman machine.

Mr. Gould Flies in an Aeroplane.

MR. MAURICE FARMAN'S headquarters at Buc are becoming quite a favourite rendezvous for visitors to Paris who wish to obtain their first experience of flight on an aeroplane. On Saturday last Mr. Gould, the American millionaire, was at the aerodrome, and was given a flight by Mr. Maurice Farman, who also took up M. Chamot. On Monday, Mr. Farman took up a Chinese General, the British Minister to Tangier, and a number of ladies and gentlemen.

New Maurice Farman Military Machine.

IN the hands of Barra very good results have been obtained with the new 20-metre Maurice Farman biplane which has been built specially for the French War Office competition for aeroplanes.



Miss Nellie Beese, the first German lady flyer who has secured her pilot's certificate. This she recently gained on a Rumpler Taube monoplane at the Johannisthal aerodrome, near Berlin.

A Night Flight for Michelin Cup.

TAKING advantage of the bright moonlight Fischer on a Henry Farman biplane started off at a quarter past one on the morning of the 14th inst., in an attempt for the Michelin Cup. He was flying



AEROPLANES AT THE FRENCH MANŒUVRES.—Capt. Félix explaining to the Grand Duke Boris the technicalities of the various machines. On the further side of the Grand Duke is General d'Amade.



FLIGHT.

FROM MECHANIC TO LEGION OF HONOUR.—The above interesting photograph reaches us from Mr. E. J. Crisp, of Market Harborough, and serves as a memento of M. Vedrines when he was acting as mechanic to Mr. Robert Loraine. The occasion was Mr. Loraine's visit to Colwyn Bay last summer, the two being seen standing together manipulating the Gnome engine.

over a course in the neighbourhood of Mourmelon and Rheims but had to give up after covering 300 kiloms. The two turning points on the course were indicated by bonfires, whilst the biplane was fitted with a headlight.

A Fatal Accident at Villacoublay.

WHILE learning to fly at Villacoublay on the 13th inst., Lieut. Chotard, of the French Army, had a fall from about 100 metres, and received injuries which resulted in his death. He had been under instructions for eight days, and had progressed so far as to make his first solo flight. Then, although the conditions were obviously not really suitable for flying, he would insist on making another solo flight. He made a good ascent, and seemed to be getting on very well when, however, the machine was caught by a gust of wind and he lost control. The aviator was at once taken to the hospital at Versailles, but succumbed to his injuries in about a couple of hours.

A Swiss Circuit.

A PROPOSAL is on foot to organise a National Flying Circuit in Switzerland in eight stages. The starting place would be Geneva and the other points Lausanne, Bienne, Berne, Thoune, Neuchatel, Yverdon and Geneva. It is proposed to restrict the event to Swiss aviators.

Hirth Has a Fall.

WHILE making a reconnoitring flight with a passenger on board his monoplane at Friedrichshafen, Hirth was compelled to come down somewhat sharply, and had to land where some artillery were practising. Two of the men and a horse were badly injured, but the aviator and his passenger escaped unhurt.

Italian Royalty in an Aeroplane.

At the Mirafiori flying ground, near Turin, on the 14th inst., the Duchess d'Aosta was taken for a flight of half an hour by Ruggerone on his Henry Farman biplane.

A Circuit in North Italy.

THIRTEEN aviators have entered for the circuit Bologna, Venice, Rimini, Bologna, which started on Sunday last. The first to arrive at Venice was Captain Piazza, who took 1 hr. 42 mins. for his journey. The second was Lieut. Gavoti, and the third Captain Moiso. On Monday, Lieut. Rossi completed the first stage, as also did Gaubert and Frey. Le Lasseur fell about 80 kiloms. from Bologna, while Leroy made a bad landing at Ferrare, and Roberts stopped about 9 kiloms. short of Venice. The second stage to Rimini was to be started on Tuesday.

New York's Mail Service.

No doubt, inspired by the London to Windsor mail service, the American postal authorities are co-operating in a demonstration which commences on Saturday next, when mails will be carried by aeroplane from the Nassau Boulevard Flying Ground, New York, to several points on Long Island.

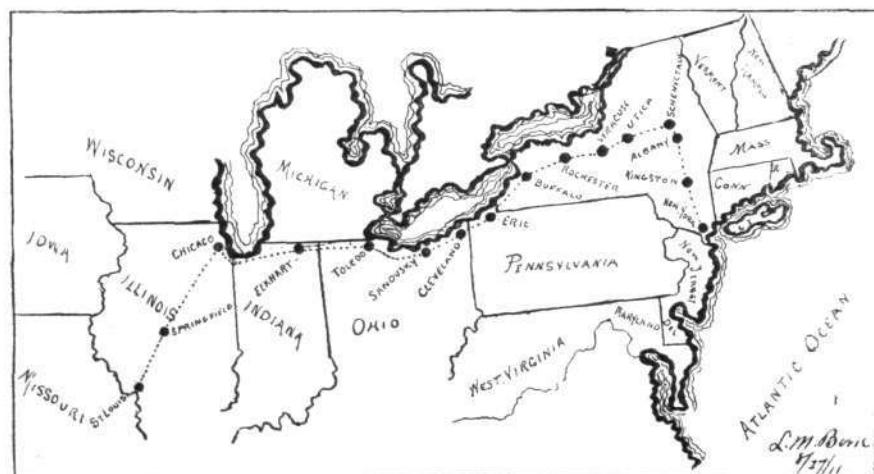
The Trans-American Flight.

NONE of the competitors who have so far started to fly across America for the £10,000 prize offered by Mr. Hearst have had very good luck. Fowler, as we noted last week, was stopped at the foot of the Sierra Nevada, while Ward, who started from New York on the 13th inst., had a fall at Omega on Saturday, after covering about 230 miles. His machine was badly smashed, but he escaped with a shaking. C. P. Rogers, who started for New York on Monday, hit a tree at Middleton, New York.

ST. LOUIS TO NEW YORK CROSS-COUNTRY FLIGHT.

The following table and map of Mr. Atwood's performance has been compiled and sent us for publication by L. M. Borie of the *New York Clipper* :—

Date	Departure from	Time.	Arrival at	Time.	Daily Run.
					Miles
Aug. 14	St. Louis, Mo....	8.05 a.m.	Springfield, Ill.	10.34 a.m.	—
14	Springfield, Ill.	1.0 p.m.	Pontiac, Ill.	2.53 p.m.	—
14	Pontiac, Ill. ...	4.30 p.m.	Chicago, Ill. ...	6.19 p.m.	286
15	Chicago, Ill. ...	3.31 p.m.	Elkhart, Ind. ...	5.47 p.m.	101
16	Elkhart, Ind. ...	8.06 a.m.	Pettisville, Ohio	10.12 a.m.	—
16	Pettisville, Ohio	3.22 p.m.	Toledo, Ohio	3.57 p.m.	133
17	Toledo, Ohio ...	10.29 a.m.	Venice, Ohio	11.28 a.m.	—
17	Venice, Ohio ...	1.18 p.m.	Cleveland, Ohio	4.41 p.m.	123
18	Cleveland, Ohio	4.03 p.m.	Swanville, Pa. ...	7.20 p.m.	84
19	Swanville, Pa. ...	11.54 a.m.	Buffalo, N. Y. ...	7.02 p.m.	99
20	Buffalo, N. Y. ...	3.20 p.m.	Lyons, N. Y. ...	5.31 p.m.	104
21	Lyons, N. Y. ...	4.24 p.m.	Bell Isle, N. Y. ...	7.17 p.m.	40
22	Belle Isle, N. Y.	4.55 p.m.	Fort Plain, N. Y.	7.05 p.m.	95
23	Fort Plain, N. Y.	7.25 a.m.	Castleton, N. Y.	9.12 a.m.	66
24	Castleton, N. Y.	7.36 a.m.	Garrison, N. Y.	9.45 a.m.	—
24	Garrison, N. Y.	11.05 a.m.	Nyack, N. Y. ...	11.33 a.m.	109
25	Nyack, N. Y. ...	1.52 p.m.	Governor's Island	2.35 p.m.	25
					Total ... 1265



Harry N. Atwood's world's cross-country record :—Distance travelled from St. Louis, Missouri, to New York City, N.Y., 1,265 miles. Flying time for entire trip, 28 hrs. 31 mins.

Previous record held by Herr Koenig, German Circuit Race, distance travelled, 1,164 miles.

AIRSHIP NEWS.

"Gamma" Has a Night Out.

LUBRICATION troubles, putting both her engines out of action, led to the Army airship "Gamma" having an exciting time on the 14th inst. She was caught by a heavy wind just at twilight and driven across the Hog's Back, but was safely brought down in a clearing not far from Farnham. She was undamaged, and being moored under the lee of some trees, she remained out in the open all night while the Engineers of the Air Battalion put the engines right. Although a strong wind was blowing on the following morning, Lieuts. Waterlow and Fox took charge of the airship and succeeded in getting it back safely to headquarters at Farnborough.

A Long Cruise by New French Dirigible.

THE new Astra dirigible "Adjudant Reau" made a notable voyage on Monday evening and Tuesday morning of this week. Issy was left at 5 p.m. on Monday and travelling *via* Meaux, Chalons, and St. Menehul, Verdun was reached at about half-past eleven. A reconnaissance was then carried out along the Eastern Frontier as far south as Belfort. At ten o'clock the airship left this latter point on her return to Paris where she arrived at half-past two in the afternoon, having been in the air for 21 hrs. 20 mins.

"Le Temps" at the Manoeuvres.

DURING the French manœuvres the Zodiac dirigible "Le Temps" was kept very busy. It was reinflated on the 7th inst. and was then out practically every day doing reconnaissance work mostly from Verdun as a centre. On the 13th inst. it was piloted from Chalons to Verdun, the distance being covered in 1 hr. 48 mins. On Saturday last it was out again for three-quarters of an hour and on Sunday during a cruise of 2 hrs. 50 mins. sailed to Danvilliers and back.

"Capitaine Marchal" at the Manœuvres.

ALTHOUGH their performances were to some extent overshadowed by the aeroplanes, good work was done at the French

AEROPLANES AT THE MANŒUVRES.

THE French Military Manœuvres were brought to a conclusion at the end of last week, the death of Nieuport towards the conclusion casting a gloom over the aviators, both military and civil, at the aviation camps. Flights by the dozen at a time were carried out during the week, and it would be a repetition of success after success to recount them in detail. Nothing but praise and admiration from the commanders has resulted, and at the end of the manœuvres several of the Aviator Reservists were recommended for the Legion of Honour, including Aubrun, Fourny, Hélen, Kimmerling, Legagneux, Loran, Martinet, Renaux, Sommer, Tabuteau, Vedrines, and Godard, the last mentioned being the dirigible pilot. Such is the opinion of France as to the value of the "Fourth Arm." Several of the military pilots were also awarded the Legion of Honour as were also a number of officers who had distinguished

THE DEATH OF M. NIEUPORT.

ALTHOUGH the list of those who have lost their life while flying is now a lengthy one, it is significant that up to last week it did not contain the name of any successful designer. Now, however, to the regret of all who take any interest in the science and sport of aviation, Edouard Nieuport is numbered among the list of martyrs to the cause. It was while taking part as a Reservist in the manœuvres in the north-east of France that the accident occurred which led to M. Nieuport's death. A suggestion had been made by the Commanding Officer that a certain flight should be carried out, and taking the suggestion as an order, M. Nieuport set out in spite of the fact that the weather was unsatisfactory. He completed the flight, but in landing at the Military Aerodrome at Charny his machine was in some way upset and wrecked. M. Nieuport was injured, but at first it was thought that, although

FLYING IN MOROCCO.

LAST week Bregi on his Breguet machine succeeded in flying with a passenger from Casablanca to Fez, a distance of about 300 kiloms. The idea was started by the *Petit Journal*, which offered to pay the expenses of the expedition, while the Breguet firm co-operated by lending one of their three-seated machines. Bregi happened at the moment to be doing his military service, so he was sent with the machine to General Moinier in order that he might assist him in the operations which were taking place. After making several flights in the neighbourhood of Casablanca, Bregi,

manœuvres by the various dirigibles. The new Lebaudy "Capitaine Marchal" carried out several reconnaissances and despatch carrying operations, and on the 12th inst. a complete exploration was made of the country between Rethel and Mezieres. Detailed reports by the army officers on board were dropped at Rethel before returning to its headquarters at Chalons.

Wireless Messages from the "Adjudant Vincenot."

ACTING under orders, the Clement Bayard dirigible "Adjudant Vincenot" left its headquarters at La Motte Breuil to carry despatches to the Commanders at Rethel, Launois and Verdun. During the voyage the airship was able to keep in touch with Verdun and the Eiffel Tower at Paris by means of wireless telegraphy, and she returned safely to La Motte Breuil, having been in the air for 13½ hrs. There were eight persons on board.

Germany Loses an Airship.

AFTER spending a day in its hangar, owing to repairs being necessary to its envelope, the Grosse Military dirigible, "M.3," was making a last reconnaissance at the manœuvres when it was necessary to land suddenly, owing to engine trouble. There was a high wind, and apparently on coming down the car of the airship bumped on the rough ground, and in some way the gas of the envelope became ignited. Fortunately the crew of seven were able to get clear of the car without being hurt. The envelope was entirely destroyed, but the damage to the car was not very serious.

The "Schwaben" Reaches Dusseldorf.

WITH eight passengers on board, the Zeppelin airship "Schwaben" left Gotha on the morning of the 12th inst., and *via* Cassel and Dortmund it reached Dusseldorf at half-past one. During a good part of the voyage the airship had to struggle against an adverse wind which allowed of very little progress being made.

THE MANŒUVRES.

themselves as observers. Especially noteworthy were the long reconnaissances carried out on the 14th inst. from Bar le Duc for the Sixth Army Corps by Fourny and Lieut. Cheutin, both on Farman machines, and Hélen, on his Nieuport, each accompanied by an observer; and at Belfort by Vedrines, on a Morane, Moineau, on a Breguet machine, and Lieut. Battini, on a Maurice Farman, who were attached to the Seventh Army Corps.

As at the French manœuvres the German military operations were considerably assisted by the work of aviators, and the impression left with the staff officers is reflected in the orders which are being given for aeroplanes. Lieut. Mackenthun especially distinguished himself on Monday week, he, in the course of a 35 minutes flight, passing right along the enemy's front and obtained information which it would have taken cavalry scouts at least four hours to find out.

THE DEATH OF M. NIEUPORT.

serious, the injuries would not be fatal. He seemed to be recovering during the day, but on Saturday morning he suddenly collapsed and passed away. The Minister of War, in view of M. Nieuport's achievements, had put his name forward for the Cross of the Legion of Honour, and in the ordinary way it would have been awarded to him at the end of the manœuvres. The Minister, however, personally pinned the Cross on the dead aviator's breast a few hours after he had passed away.

Apart from the aeroplane which he designed, on one of which Weymann won the Gordon-Bennett Trophy recently and on another Hélen holds first place for the Michelin Cup, M. Nieuport was the designer of a very successful two-cylinder engine which had given excellent results, while the magneto and sparking plug designed and manufactured by him are known throughout the motoring world.

FLYING IN MOROCCO.

on the 14th inst., set out with M. Lebaudy, of the *Petit Journal*, to fly to Fez. They carried on board their arms and provisions as well as camping equipment, the latter including a cover for the machine in case it should be necessary to land during a storm. The pilot, passenger and baggage represented a load of about 350 kilogs. Bregi on starting from Casablanca made for Rabat, stopping on the way at Feldha in order to deliver a message to his uncle who is in command of a regiment of Zouaves. On the following day he continued on his way and reached Fez safely.

CORRESPONDENCE.

* * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which they have read in FLIGHT, would much facilitate ready reference by quoting the number of each such letter.

Dr. Hankin's Study of Bird Flight.

[1363] I want very much to congratulate you on the Hankin papers: there is not the smallest doubt that they will become classical. They remind one of Langley, and reading them makes one realise to what a pitifully poor level the general run of aeronautical literature has sunk since the bigger men died or dropped out, and the theory became the special care of the host of third-rate engineers and tenth-rate mathematicians who swarm over everything nowadays, men who could never have got a hearing in any better-understood branch of science. What a difference there is between the tone of these Hankin papers and that of the mass of pseudo-scientific rubbish, hastily conceived and aggressively trumpeted, with a pyramid of premature theory balanced on a pebble of fact, which we are told constitutes "modern aeronautical theory." Every line of the Doctor's papers show the true, trained scientist, the genuine disciple of Bacon, the man who is content to observe facts, facts, and nothing but facts, with mechanical impartiality and perfect restraint until he has enough ground upon which to venture a *conjecture*. Not even an asserted *theory*, for in real science a theory is an almost sacred thing. It is, so to speak, the canonization of a conjecture, an event that frequently requires fifty years for its consummation.

That Dr. Hankin is a man of science is evident and, apparently, he also has that rarer trait—a clear mind that is able to perceive some very broad, simple, and fundamental thing clearly indicated beneath all those individual complexities which ordinarily arrest and retain the attention. In the concluding paragraphs of the last published article, where the Doctor rules out for the nonce certain hypotheses as to ascending currents, the succeeding inference as to the "fine-grained heterogeneity" of the air is a most beautiful piece of clear thinking.

I am inclined to think, however, that the ascending current hypotheses cannot be ruled out thus, and think that there is a great deal in Huffaker's theory (I believe it is Huffaker), that the heated air is in a state of unstable equilibrium with regard to the colder layers above it, and that flapping round in a circle creates the required ascending current. I have seen vultures, disturbed while feeding and apparently heavily gorged, flap slowly and laboriously round in a circle of perhaps 120 yards diameter, not all on one side of the circle, but spread out round the circumference, wings almost touching the ground, gradually exhibiting increasing buoyancy, and (if I can trust my memory), increasing speed until at about twelve or fifteen feet up they suddenly unanimously started soaring and then rose rapidly.

I have seen cranes soaring at about 500 feet circling about a point in the middle of the group, which group was so compact that the birds appeared fitted into one another so that no one could revolve on a vertical axis without fouling the next. Probably an effect of perspective, some being higher than others. There were about a dozen birds, and the diameter of the group may have been as much as twenty-five feet and was certainly not more than thirty. They were obviously in one of the narrow ascending columns which are common in those parts. These columns have clearly defined bases of sometimes as little as three feet across. I write, of course, from general memory, and not from estimations made at the moment.

My bird work has, as you know, been mostly done among sea birds, and my attention entirely devoted to such birds as were what Dr. Hankin calls "flex-gliding," and which I used to call in my notes "travelling," because it was the form of gliding adopted by the bird when it wished to go from one point to another, and not merely to move lazily along searching the water for food. I have a number of photographs of birds "flex-gliding," some of which might form excellent confirmatory evidence of the Doctor's notes. I have several of ospreys "flap-gliding," but only one showing "flex-gliding," and that so small that it might be a crow from all one can see. I can bear out Dr. Hankin's remarks about the non-directive effect of head movements, having often seen gliding ospreys eating fish held in their claws. They seem, however, to lower the head very gingerly, bringing the claws forward at the same time equally gingerly, as if afraid of disturbing their centre of gravity. I have seen a gull while "flex-gliding," plume the underside of his left wing with his beak without altering his mode of flight, though he may have made some unnoticed balancing adjustments.

Gulls soaring over open sea invariably congregate together over one particular spot, which indicates a local ascending current. I have never seen the phenomena of general soarability throughou-

the whole atmosphere of which Dr. Hankin speaks, when I have been observing sea birds. Gulls "ease-gliding" over a definite ascending current such as is formed by the presence of a cliff on windy days, or such as exists over the stern of a moving ship, generally adopt the "flex-gliding" position of the wings.

Flex-gliding in still air always involves increase of speed, great increase of stability (which was what interested me), and loss of height. "Ease-gliding" in such an up current as I have described requires velocity to maintain headway against the strong wind, also the wind velocity renders the up current very powerful, which two facts account for the necessity for, and the feasibility of, the adoption of the "flex-gliding" attitude.

What conclusions Dr. Hankin may have drawn from his observations—and one cannot discuss these until they are published—there is no doubt that the notes of his observations are priceless, and I hope they may eventually be published in full, together with the present series of papers, in book form.*

J. W. DUNNE.

[* It is the intention of Dr. Hankin to issue the work in volume form.—ED.]

Cardiff Sportsmen and others—a Comparison by Mr. Hucks.

[1364] Since my last visit to Cardiff by way of the air I am impressed by the different manner in which people receive the new science of aviation. Earlier in the year, whilst flying cross-country from Hendon, I had occasion to make an unexpected landing at an early hour in the morning in the private grounds of the rector at Barton (Bedfordshire). I was immediately received with the utmost cordiality by the rector, who at once had breakfast prepared for me and with whom I stayed for two days as his guest. He took the utmost pains to assist me, sent his gardeners to help me with the machine, and even went to the extent of having a long length of iron fencing removed entirely in order that I might fly my monoplane away with less risk. I was much impressed by his kindness and regarded him as a thorough sportsman as well as a rector.

The other case, by way of comparison, was my descent at Whitchurch (Cardiff) polo ground last Sunday morning, which, I ought to mention, was in no way pre-arranged as I did not know my destination when I left Weston, but I told my manager there I would try to pick out a good field in the Cathays district. Several places were suggested to me, but I thought it best to decide after having had a bird's-eye view of them.

To my great surprise to-day a letter reaches me indirectly from the assistant-secretary of the Cardiff and County Polo Club, the contents of which were roughly to this effect:—"How dare you land on the polo ground, and who gave you permission?" Well, sir, I have replied to this letter, not without being impressed by the difference between my sporting friend, the rector, and the sporting (?) club whose ground I unfortunately chose as a landing place.

Royal Hotel, Cardiff, September 12th. B. C. HUCKS.

The Army Airships.

[1365] In answer to Mr. Balfour's query No. 1,356, I have great pleasure in informing him and the public at large that the Clement and Lebaudy airships are both housed in "A" dirigible shed at S. Farnborough. As to the state of the ships in question, I may say that the Clement Bayard was taken to pieces in the latter part of last year at the *Daily Mail* garage, Wormwood Scrubs, and was ungracefully and disgracefully brought down to Farnborough on steam lorries. Since then it has remained in its "la pancake" condition, and no efforts whatsoever have been made to reconstruct it. As to the ill-fated Lebaudy dirigible, it was wrecked on May 4th, 1911, at S. Farnborough, the direct cause being due to the fact that a strong wind sprung up which evoked excitement and bad calculation on the part of the pilot. Since that time the airship (in pieces) has lain in the large dirigible shed untouched, no doubt the cause being due to the fact that the interested parties, viz., the *Morning Post* and Lebaudy Bros. had—well, complications regarding the same.

S. Farnborough.

"QUICK-SNIF." *

The Facts of the Plymouth Meeting.

[1366] I think that possibly it would interest you and your readers to hear the experiences of an onlooker at the first aero meeting held at Plymouth.

M. Blondeau and Mrs. Hewlett were engaged to fly at the Plymouth Race Course on Saturday, Monday and Tuesday ast at

MODELS.

The Limit of Long-Distance Flyers Propelled by Elastic.

2.30 to 4.30 in the afternoon and 5.30 to 7 o'clock in the evening, so, naturally, on Saturday morning I had expectations of seeing my first flight; but Fate intervened! It appears that the wrong truck was sent to take the machines to Plymouth, so that they did not arrive until Sunday morning.

On Monday I arrived outside the ground at 4.30, and was just in time to see a machine of the Farman (1910) type flit over the trees, and stay about five minutes in the air before it glided to the earth. This ended flying in the afternoon session.

It appears that the "remous" were very treacherous, and Blondeau sensibly declined to smash his machine for the sake of a small crowd. I then motored over to Plymton, and arrived back to the flying ground at 5.40, and after waiting outside for about fifteen minutes I went into the ground just in time to see the machine pass over my head, and after three circuits Blondeau came down. Unfortunately his throttle refused to work at the right moment, and the machine was carried on further than he intended, and ran into some small woodwork outside the hangar, unfortunately puncturing both tyres. He complained of the condition of the air being in a most unsuitable state for flying, and so it was decided not to fly any more that evening.

Tuesday it appears that a grave misunderstanding arose. It seems that the air was in a very troubled state early in the afternoon, and M. Blondeau refrained from going up. However, later on he tried his machine, and found that one of his cylinders was knocking and required some slight adjustment. At this point, the management appeared on the scene and wanted to know why there was no flying and when he would fly. M. Blondeau informed them that flying would take place in a quarter of an hour, and it would only take a short time to effect the necessary repairs to his machine, but this answer did not satisfy the impatient management, who had the crowd dispersed, and said that there would be no more flying at all. Here Mrs. Hewlett intervened with a slight argument; the details and causes it is not necessary to relate. Mrs. Hewlett handed the management back their cheque, and so the meeting came to an abrupt ending.

A little after this time at a quarter to six, I arrived with a gentleman on the staff of the *Western Morning News* and got entry to the ground. We were immediately jostled about by some of the policemen, but fortunately a short interview with M. Blondeau was all that was required for us to remain. M. Blondeau then got into his machine and executed some of the finest flights of the meeting. Making a magnificent and short rise off the ground he rose to a height of about 120 ft., and proceeded to do several circles around the course; then he made various circles round the trees, of which this ground, unfortunately, abounds, and after giving us most excellent demonstrations of aerial flight, he made a very pretty short *vol plané*, with a glide to the ground to follow. He then decided to take up a lady friend of Mrs. Hewlett as a passenger, and he again gave us some excellent demonstrations of flying, ending with a very fine *vol plané* with a glide to the earth. Thus the flying closed for the evening, and after wheeling the machine back to the shed M. Blondeau and myself had a very interesting chat in the hangar, where he pointed out that the ground was most unsuitable for flying in.

George Street, Plymouth.

T. R. JOHNS.

British and Foreign Brevets.

[1367] I have often wondered what is to account for the difference in the amount of information divulged in the lists that appear from time to time in FLIGHT of the latest certificate holders in France and England respectively.

The extent of the knowledge in your English lists seems to be limited to the name of the holder and the number of his *brevet*, whereas your French lists contain fullest particulars of the date and place of birth of the pilot, the type of machine on which he qualified, and the aerodrome at which the tests were carried out.

Surely such a list of our latest English certified aviators would be much more interesting and instructive to your readers and much more worthy of being placed on record than the meagre one that is at present published in your otherwise very helpful journal.

Golders Green.

"CANARD."

What is?

Torque. Torque is another word for twist, but whereas twist implies that the actual material is appreciably distorted, torque is merely a technical expression indicating that the shaft has a twisting effort applied to it. In other words it is an expression denoting the turning force on a shaft and corresponds to the term leverage. It is measured in pound-feet, ounce-inches, or any other convenient combination of units.

Gliding Angle. The gliding angle is the slope of the path followed by the centre of gravity of the machine during a glide in still air. The angle of incidence represents the attitude of the wings to the line of flight as measured by the slope of the chord.

[1368] A good deal has been written lately about the design of long-distance models, or "flying-sticks" as they are termed by some, in the columns of FLIGHT. Several correspondents seem to be labouring under erroneous ideas about the efficiency of elastic-driven models, and it is before these people we would bring our suggestions.

First of all, it is commonly thought that the larger the number of strands in an elastic motor the more powerful it is, but really the power is not necessarily greater, for another factor has to be taken into consideration, namely, the speed of the propeller. Suppose we have a given elastic motor, the elastic will weigh a certain amount and will store a certain number of foot-pounds of energy. Now the power of this motor being measured in foot-pounds per second, all depends upon how many foot-pounds are given out per second; if it be fitted with a large or coarse-pitched propeller it will give out its energy more or less slowly, and consequently will not develop as much power as if it were fitted with a smaller or finer-pitched high-speed propeller. It all depends upon the fact that power is rate of doing work, the work in this case being the revolving of the propeller, and the power is measured by the rate of revolving the propeller besides its own weight.

So we see that cramming on elastic does not mean cramming on power, provided that the elastic can be made to take a long time to run out. Now there are three ways in which it can be made to do this: (i) by having a long fuselage, and getting a long length of elastic with few strands; (ii) by having a comparatively short fuselage with many strands and gearing up with gear-wheels, making the elastic revolve slowly and the propeller quickly; (iii) by having the elastic as before, but instead of gearing up with gear-wheels, making the elastic revolve slowly by using large or coarse-pitched slow-speed propellers. Most flying-stick designers employ the first method of obtaining length of time in which the elastic may run out; the second is hardly used at all, chiefly owing to the friction of gear-wheels, when the same object may be attained just as easily by the third method. Thus the successful flying-stick of the future will be both long and large-propellered, fitted with enormous skeins of elastic, though, of course, it will not be overpowered.

As to the greatest distance which an elastic-driven model will fly, there certainly is a greatest distance, as may be seen from the following simple calculation:

Suppose the whole of the weight, say 1 lb., were in the elastic, and the weight of the aeroplane part, whose gliding angle we will put at 1 in 8, is minimised so as to be negligible, then the whole of the energy of the elastic, which is somewhere near 1,300 ft.-lbs., will be used in propelling itself through the air, for which a thrust of $\frac{1}{8}$ lb. is necessary, therefore the elastic, storing 1,300 ft.-lbs. of energy exerting a thrust of $\frac{1}{8}$ lb., will propel itself $1,300 \times 8$ ft., or nearly 2 miles. Also it is quite obvious that any weight of elastic will propel through the same distance; this is analogous to the fact that the pull of gravity on stones of different sizes, being proportional to the weights of the stones, will cause them to fall the same distance in a given time. Of course the weight of the framework, planes, and propellers could never really be negligible, but if it could be reduced to one quarter the weight of the whole, the elastic making up the other three-quarters, the aeroplane ought to fly $1\frac{1}{2}$ miles. So this distance seems to be about the limit to elastic-driven models unless the gliding angle can be decreased, for if a model could glide at an angle of 1 in 16, it could be made to fly twice as far, so that the aim of those who seek to make their models fly far should be to make them glide better.

The case of the Mann monoplane described in FLIGHT bears out exactly what I have said about the distance which a flying-stick can fly. Taking its total weight as 4 ozs., the weight of the elastic as 1 oz., and the gliding angle 1 in 8, we find that it will store $1\frac{1}{2}$ ft.-lbs. of energy, it requires $\frac{1}{8}$ oz. or $\frac{1}{32}$ lb. thrust, and should go $1\frac{1}{2} \times 32$ or 2,600 ft., which is just about what it has done; but if the weight of the planes, fuselage and propellers could be reduced to 2 ozs., and 2 ozs. of elastic employed while altering the propellers suitably, it would seem as if it could double the distance it has already covered.

In conclusion, we think that much greater distances than have as yet been attained will soon be flown by real model aeroplanes, power driven scale models, not flying sticks or "flying elasticks" as they will in the process of time become.

G. T. R. HILL.

[It is a pleasure to receive a well thought out and carefully written letter like the above, which we can publish absolutely unedited. Moreover, we congratulate our correspondent on his clear thinking and well-ordered arguments.

Elastic materials are capable of storing energy by physical dis-

tortion just as an accumulator can store electricity by chemical change. If they are over charged they fatigue in action and ultimately break. Steel springs afford a good example of this, and it may be mentioned that it is common automobile engineering practice to store not more than 4 ft.-lbs. of energy for every pound of steel used in the spring. It is possible to store much more than this, but to do so is not considered consistent with safety.

In an elastic motor precisely the same principles rule; there is a limit beyond which it is not good practice to stress the elastic, but the better the quality of the elastic the higher this limit. If manufacturers of this material could produce something superior to that already in use, the effect would be, as is clearly shown in the above letter, to increase the normal flight range of models. Our correspondent might with advantage, however, give further data relating to his stated present value of this material, which he places at 1,300 ft.-lbs. per lb.

We especially commend the attention of amateur model makers to the paragraph in the above letter that draws an analogy between the propulsive force of elastic and the drag of gravity.

The efficiency of the machine, as represented by its gliding angle, is the governing factor in the rate at which the stored energy is being consumed. The higher the efficiency the slower the rate and the longer the flight. It is the same in real aeroplanes where the energy is stored in petrol instead of elastic.—ED.]



A model and its "shed," constructed by L. Baxter (Leeds). It is 7 ins. span, and every part is workable.



COURT OF BANKRUPTCY.

Aviation Courses Ltd. The financing of Doncaster and Burton Meetings.

MEETINGS of creditors and contributories were held at the Bankruptcy Court last week in the liquidation of Aviation Courses (Limited), of 199, Piccadilly, W., a winding up order having been made against the company on June 14 last.

Mr. H. M. Winears, Assistant Official Receiver, presided, and stated that the company was promoted by Mr. A. E. Kemplen, and was registered as a private company in February, 1910, with a nominal capital of £2,000 divided into 1,500 preference shares of £1 each and 10,000 ordinary shares of 1s. each. Its object was to hold aviation meetings; and Mr. Kemplen had stated that he was a motor engineer acquainted with most of the French aviators and many organizers of aviation meetings. There was no share capital provided by the public, and in order to raise funds for aviation meetings certain financiers were approached. Ultimately Mr. M. E. Williams, chairman of the company, introduced Mr. Charles Harrison, who was a member of the firm of Duncan Forbes and Co., and on June 2nd, 1910, an agreement was entered into under which Mr. Harrison was to advance £5,000 for the purpose of financing a meeting at Doncaster, in consideration of his receiving two-thirds of the net profits realized from the meeting.

Mr. Williams was voted a commission of 5 per cent. for introducing the capital, and £50 on account was paid to him. Mr. Harrison or Duncan, Forbes and Co. failed to provide the £5,000, but, eventually £2,651 was received by instalments.

The Doncaster race course was rented for a week and meetings were held on September 19th, 20th, 21st, 22nd, 23rd, and 24th, 1910, but were financial failures, the receipts only amounting to £992, while the expenses were £3,138. Mr. Kemplen had informed the Official Receiver that the delay in obtaining the advance from Duncan Forbes and Co. prevented adequate arrangements being made, and the failure of the meeting was also due to the stormy weather which prevailed, and to the fact that the public were abe

to watch the flying from outside the racecourse without paying for admission.

A meeting was afterwards held at Burton-on-Trent under the control of a local committee, including the Mayor and several members of the Corporation, and although that meeting was more satisfactory, a loss of £383 was incurred, the receipts amounting to £2 279 and the expenses to £2,662.

Early in this year the company endeavoured to make arrangements for holding an aviation meeting at Stoke-on-Trent, and an agreement was made with the corporation of that town to give exhibition flights at the Longton Park fêtes on June 5th and 9th last, a deposit of £150 being paid to the company by the corporation. Two aviators were sent, but were unable to fly owing to the ground being considered too dangerous by reason of the surroundings and stormy weather, and the corporation now claimed for the return of their deposit, which was expended in connection with the meeting.

A statement of the company's affairs showed unsecured liabilities £1,097 14s. 4d., assets £122 9s. 5d., subject to a lien for law costs; and a deficiency with regard to creditors and contributories of £1,774 14s. 11d. A proof of debt for about £3,000 was lodged by the trustee in the bankruptcy of the partners in Duncan Forbes and Co., but it was stated by the directors of Aviation Courses that the claim was satisfied before the winding up order was made.

The liquidation was left in the hand of the Official Receiver.

PUBLICATIONS RECEIVED.

Electrical Ignition. By M. A. Good. London: E. and F. N. Spon, 57, Haymarket. Price 3s. net.

Catalogue.

"Valkyrie" Monoplane and Parts. The Aeronautical Syndicate, Ltd., Collindale Avenue, West Hendon, N.W.



Aeronautical Patents Published.

Applied for in 1911.

Published September 21st, 1911.

6,647.	H. D. DE M. CAREY.	Stability of flying machines
12,892.	A. HORTON.	Aerial vessels
20,97.	E. BRAUNSMAN.	Steering for heavier flying machine
23,658.	A. VLAICU.	Flying machine

Applied for in 1911.

Published September 21st, 1911.

3,147.	H. LA V. TWING.	Flying machines
7,303.	J. J. SLOAN.	Aeroplanes
9,785.	A. HORTON.	Device for aerial vessels



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